

# THE IRON AGE

THURSDAY, AUGUST 23, 1900

## Hydraulic Engineering in the Metropolitan Power House.

The Metropolitan Street Railway Company have erected on First avenue, above Ninety-fifth street, New York City, a fine building of buff and Milwaukee brick, with carved stone trimmings and terra cotta ornamental work, from plans prepared by A. B. Porter, 621 Broadway, New York. This building stands 111 feet high from the curb to the top of the parapet, and contains what is said to be the largest power plant in the world.

north side are finished to be used as offices. It is expected that the structure will house a working force of 300 men. There are also three suites of apartments for the families of resident engineers and operators.

### The Water Supply.

From the magnitude of the engines and boilers and fire protection system provided, it will be gathered that an enormous water supply would be required above that which would be required for the ordinary water service of the building and for the plumbing fixtures. The water service system has been installed by the firm of

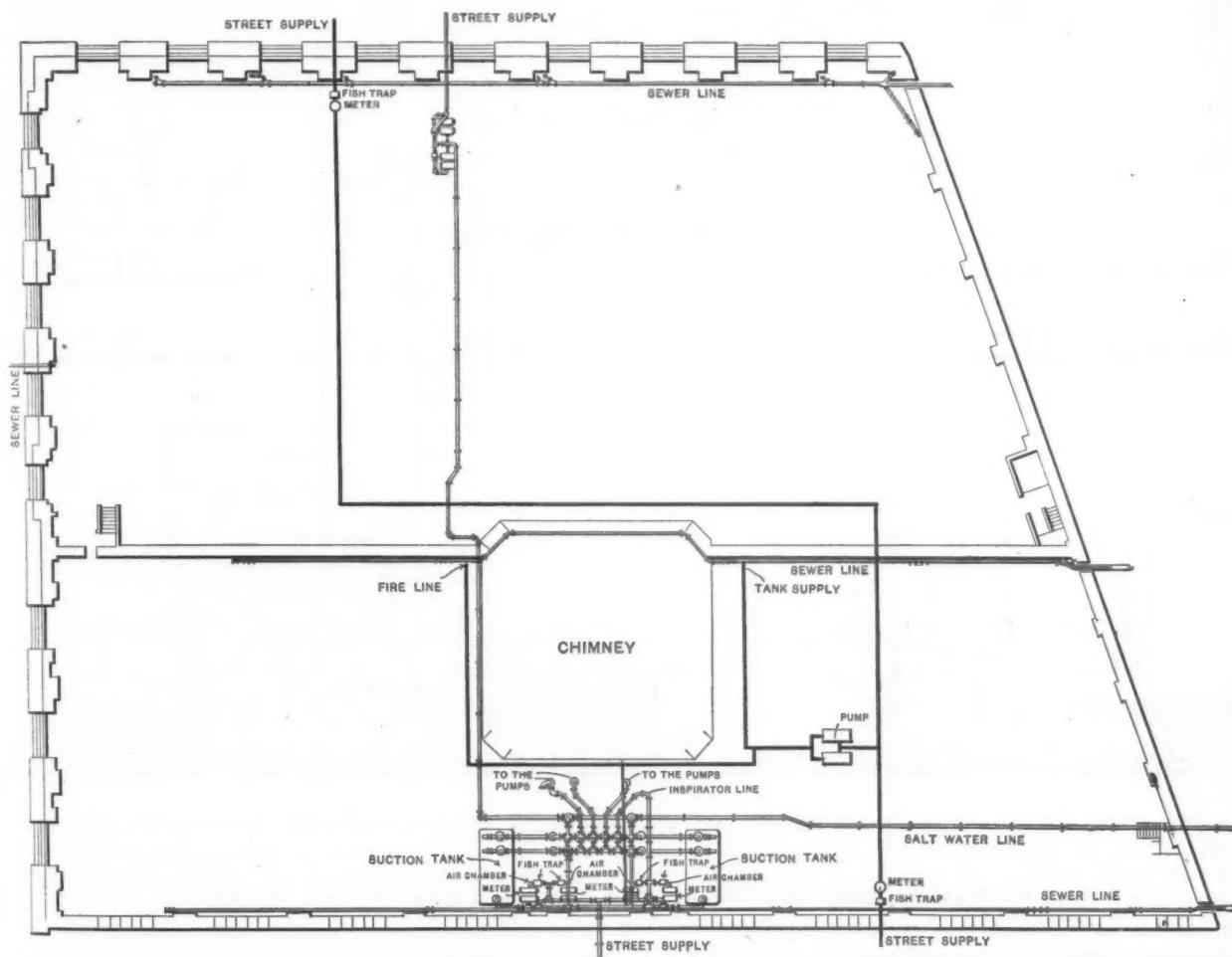


Fig. 1.—Plan of Basement, Showing Water Supply and Sewer Piping.

## HYDRAULIC ENGINEERING IN THE METROPOLITAN POWER HOUSE.

M. G. Starrett was the consulting engineer working with Mr. Porter in equipping the structure. The building is irregular in shape, its largest dimensions being a front of 201 feet on First avenue extending clear back to the East River, with 279 feet frontage on Ninety-fifth street. The building is divided lengthwise, one side being used for the engine room and dynamos. This department contains 11 Allis vertical engines of 7000 horse-power each. The other side of the building is devoted to the boiler room and contains a battery of 87 boilers for running the engines and pumps, elevators and other apparatus requiring power in the building. Above the boiler room is an enormous coal pocket, having a storage capacity of 10,000 tons. The top floors of the

Byrne & Murphy, 680 Park avenue, New York City, the work being done under the immediate supervision of Thomas F. Doherty, who had complete charge of this contract.

### Supply Pipes

A general plan of the basement is presented in Fig. 1, which shows the two 10-inch sewer lines at the north and south sides of the building, and the 12-inch sewer line which runs down the dividing wall between the engine and boiler departments. The water supply is divided into two parts. The smaller system takes water through 4-inch mains from both Ninety-fifth and Ninety-sixth streets, and is used entirely for drinking, fire protection and the purpose of supplying the plumbing

fixtures. There is a water meter where the service pipe enters the building and both connect direct with two small Snow steam pumps. The main supply, designed for furnishing water not only for steam making purposes in the large boilers, but also for cooling the jackets of the engines, is taken from Ninety-fifth street through a 12-inch pipe and supplemented with a 6-inch supply from Ninety-sixth street, these pipes being connected together, and provided with valves, so that either or both can be used. The 12-inch water service on the Ninety-fifth street side of the building makes a network of pipes and valves, as may be seen in Fig. 2, which is a plan showing the arrangement. Immediately on the 12-inch pipe entering the building there is found a large gate valve so that the water supply may be shut off if

the street and branches, passing reduced in size over to the pipe which drops down and connects through the fish traps to the supply system. It also shows the method of cross connecting so that the water can be pumped direct into the main in case of necessity when the meters are not in use. The left half of the plan is an elevation showing the pump connections to the suction tanks. In addition to the street supply, arrangement is made for taking salt water through a 12-inch main from the East River in case of a shortage of water supply from the city main, or of an accident to that system. In addition to the suction tanks, there are 14 other large tanks designed to receive the water that has been used in cooling the working parts of the engine, so that it may be used again either for feeding the boilers or for cool-

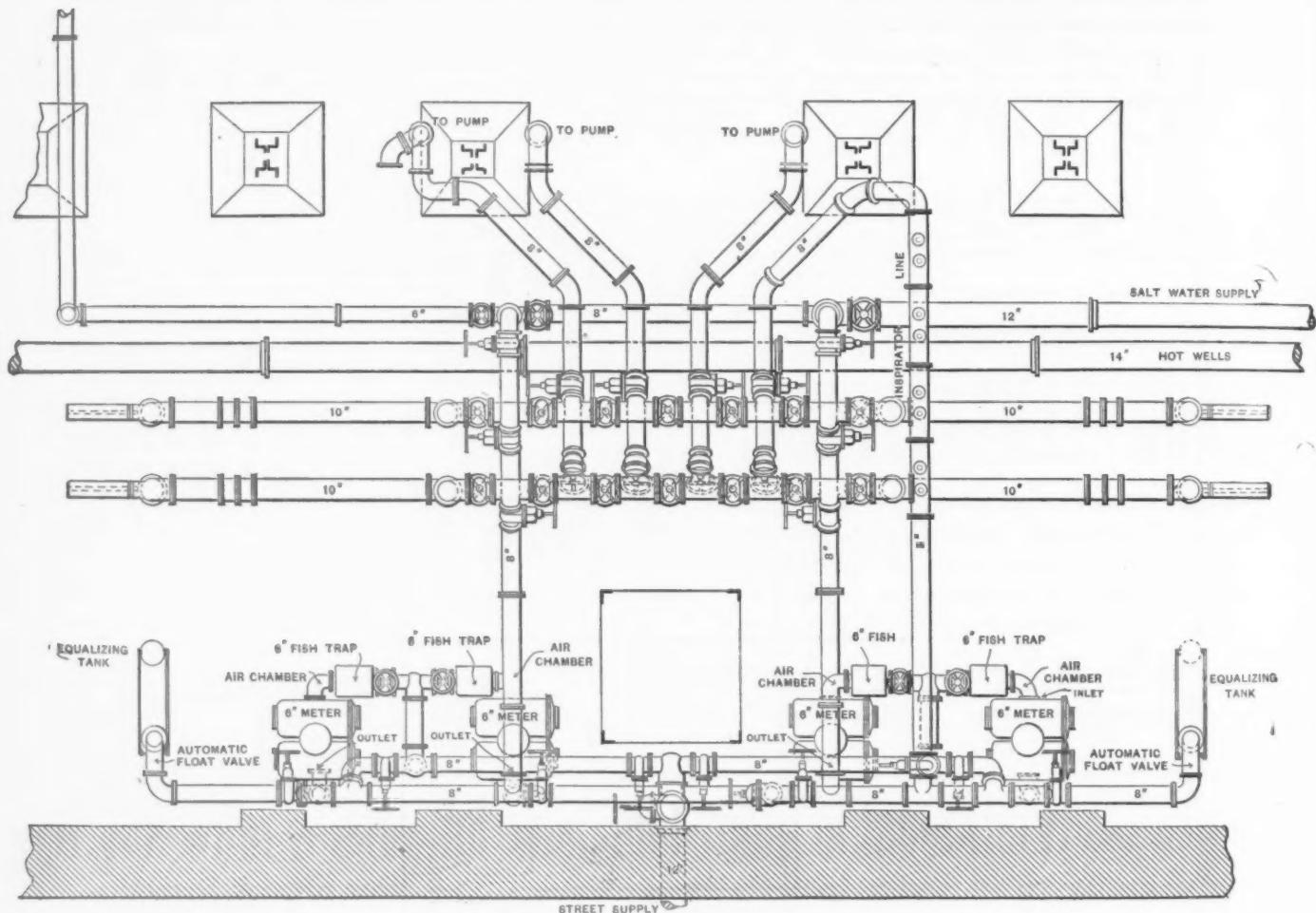


Fig. 2.—The Main Water Supply System.

#### HYDRAULIC ENGINEERING IN THE METROPOLITAN POWER HOUSE.

necessary. This pipe rises and branches into two 8-inch pipes, one running each way to a battery of Worthington water meters. Before the water enters the water meters large fish traps are provided to prevent the entrance of fish or eels or other foreign matter to the meters and pumping machinery. These fish traps have large chambers provided with screens for preventing any solid matter from getting through. Valves are so placed that the supply can be shut off and the top of the trap removed for the purpose of taking out any matter that may have accumulated.

##### SUBSIDIARY SUPPLIES.

After passing through the meters the water passes into two large suction tanks, which have a capacity of 9000 gallons each and are arranged so that the pumps may have an ample supply of water to draw from at all times without putting a strain on other parts of the service system. A front elevation of two different parts of the service system is shown in Fig. 3. The part at the right shows the 12-inch service pipe as it enters from

ing purposes after it has been reduced in temperature. All of these different supplies are connected by an arrangement of valves so that any one supply or a combination of them may be used or shut off as desired.

##### CROSS CONNECTIONS.

Another view of the water service system is presented in Fig. 4, which is an elevation through the center showing the large service pipe entering from the street, its branches dropping down and connecting with the fish traps, which are in turn connected with the water meter, also the outlet connecting with the pipe which supplies the large suction tanks, an automatic cut off valve, operated by a float, being provided to prevent flooding. This plan also shows the method of making the cross connections which, with the aid of the valves, enables any part of the system to be used at will. The system is also provided with an inspirator line designed to use the steam direct for supplying water when for any reason the pumps may not be available.

**Unusually Large Fittings Used.**

A view is presented in Fig. 5 looking toward the street main, showing the fish traps and meters at one side, and the air chambers that are put on the ell's which connect the fish traps with the meters. These air chambers are 8 inches in diameter and more than 6 feet in height. In the supply system, shown in Fig. 2, there are included 51 gate valves, of which 11 are 6-inch, 24 are 8-inch, 14 are 10-inch, and 2 are 12-inch. There are 3 8-inch and 2 10-inch lines of pump suction pipes from the tank used for supplying the three big Snow pumps on the floor above. A 14-inch hot water line connects the different cooling tanks with the suction tanks and acts as an equalizer to all the tanks in the basement.

All of the pipe and fittings in this supply system are of cast iron capable of standing a severe pressure. It may be seen from the elevation presented in Figs. 3

any other accidental cause. Valves are so placed on the main tank line in connection with a check valve on the fire line that water may be pumped direct into the fire lines in case of need. The main fire line branches into a number of branch supplies in the upper part of the building which connect with falling supply pipes provided with hose connection on the different floors. Connection is also made with the tank for supplying the several bathrooms and toilet rooms on the different floors.

**Ice Water System.**

Another connection is made for supplying ice water to the employees in the different parts of the building by the system shown in Fig. 7. This system may be supplied direct from the tank on the roof, or, if required, the water can be pumped into it. A filter is placed on the supply side to purify the water used for drinking

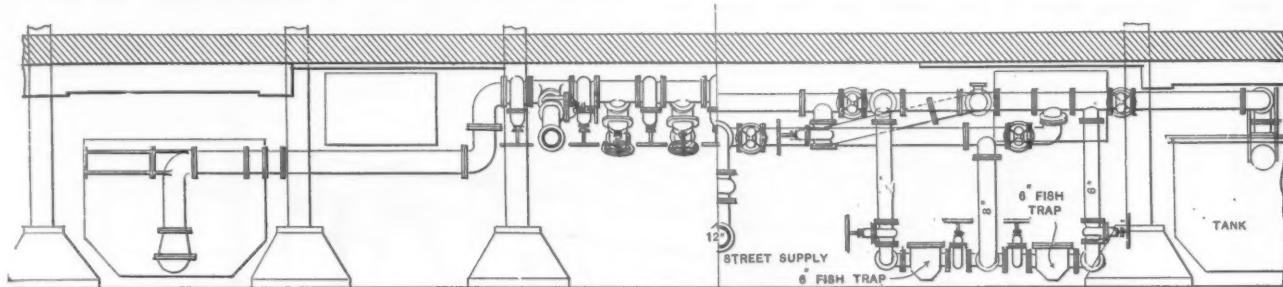


Fig. 3.—Elevations of the Water Supply System.

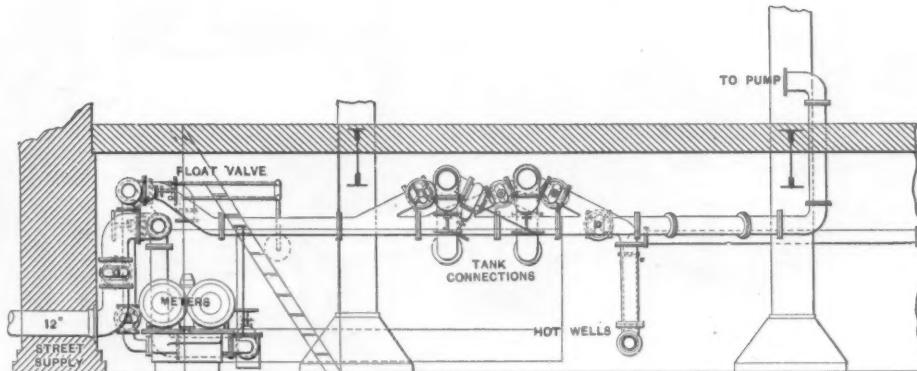


Fig. 4.—Side Elevation of the Water Supply System.

**HYDRAULIC ENGINEERING IN THE METROPOLITAN POWER HOUSE.**

and 4 that many of these fittings are of unusual shape or angle, and in consequence all were manufactured from sketches drawn to suit the requirements. The connections are made by means of heavy flanges on the fittings, no screwed joints being used on this part of the system. It is worthy of note that the accuracy of the sketches and the fittings completed from them enabled the work to progress without delay, only slight alterations having to be made in one or two instances.

**The Plumbing and Fire Protection Supply.**

Independent of the large supply system that has been mentioned there is another supply for fire protection and general use coming from two separate connections, one on the Ninety-fifth street and the other on the Ninety-sixth street side of the building, 4 inches in size, connecting through fish traps and water meters with two pumps which drive the water to two 5000-gallon tanks on the roof, as shown in Fig. 6. The supply to the tanks is automatically governed to prevent overflow. The two tanks are connected together with an equalizing pipe so that the water line in both will be the same and that one tank shall not overflow before the other one is filled, in case of a stoppage in the supply pipes or by

purposes. The outlet of the filter is connected with a coil of tin lined pipe placed in a large ice box in the basement, having a capacity for holding more than a ton of ice. This ice box has been located in the basement to avoid the labor of carrying the ice to the upper floors, from which the cold water would circulate naturally. To cause the cold water to flow as freely at the drinking fountains on the upper floors as at those on the lower floors there is one cold water rising pipe leading to a point above the highest drinking fountain in the building, from which it branches to the falling cold supply lines which furnish water to 14 drinking fountains in various parts of the building. By this means, as soon as any drinking fountain is opened the cold water must flow up from the coil in the ice box and fall to the faucet that is opened. The lower ends of these cold water supply lines connect together and are carried to the ice box, where they connect with the supply, between it and the filter, check valves being placed so as to prevent a stagnation of the coldest and heaviest water at the bottom of the system.

**The Plumbing and Toilet Rooms.**

Careful consideration for the comfort of the employees is reflected in the plumbing arrangements of the

building. On the boiler side of the structure a number of toilet rooms have been provided, with shower bath rooms immediately above, for the use of the engineers and firemen. The toilet rooms are provided with lavatories, urinals and water closets, as shown in Fig. 8, the arrangement of the shower bath room above the toilet rooms being shown in Fig. 9. Wherever it is possible the waste from the drinking fountains is allowed to discharge over a lavatory; in other cases it is connected with the house drainage system after being carefully trapped and vented. The plumbing throughout is in conformance with the regulations of the city of New York, and the fixtures used are of a high grade, earthen ware siphon closets and earthen ware urinals of improved type being used in connection with enameled cast iron sinks for lavatories, supplied with substantial nickel plated brass work. The drinking fountains are of a special design, having nickel plated self closing faucets. The long lines of soil, waste and vent pipes re-

battle ship "Hannibal" also sent and received messages to and from the battle ship "Jupiter," when under way, over a distance of 32 miles. One message was sent 100 miles, the greatest distance successfully covered.

While there were none of his assistants with the land forces in South Africa, his system of telegraphy was used by Lord Roberts and a modification of it by General Baden-Powell. Generals White, Buller and other English officers did not take kindly to the new invention, and instead of using the instruments sent to them for all they were worth, they relied upon the old time heliograph. It was this prejudice against the new invention that kept wireless telegraphy so much in the background during the early stages of the campaign, and it is possible that it would have received scant notice in the South African campaign had not Lord Roberts assumed command. He was not a kind to keep anything that would serve his purpose in the background simply because it had never been tested in the past. Upon assuming command in South Africa he summoned a body of wireless telegraphers and kept them in his camp all through the struggle. These experts kept him in touch with the various units of his enormous army, and some

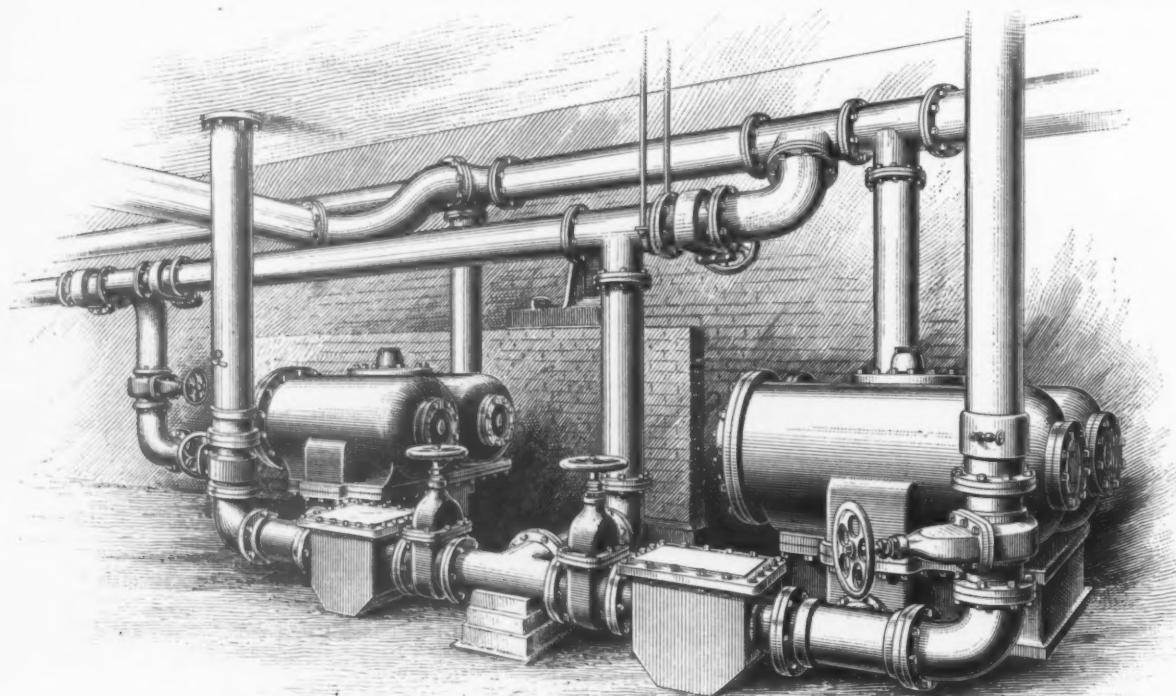


Fig. 5.—General View, Showing Supply Pipes, Fish Traps, Meters, Air Chambers, &c.

#### HYDRAULIC ENGINEERING IN THE METROPOLITAN POWER HOUSE

quired in so high a building, as well as the leader pipes carrying the water from the roof, were all constructed of wrought iron pipe with recessed fittings.—*The Metal Worker.*

#### Wireless Telegraphy in War.

A correspondent of the *Electrical World and Engineer* writes to that journal as follows:

When Signor Marconi was in the United States last fall he had the opportunity of testing his wireless telegraphy at the yacht races for the America cup, and the success obtained then in times of peace induced him to remark, "I'd like to try the system in a war." His second visit to this country now comes after an interval of six months of severe fighting in South Africa, where his system of wireless telegraphy has been in use on land and sea. The test in time of war has proved even more interesting and important than in the international yacht races off Sandy Hook.

Signor Marconi did not go to South Africa personally, but several of his assistants went there with several outfits of wireless telegraphy, and they operated in conjunction with the fleet patrolling the coast. They confined their attention exclusively to sending messages between the several war ships and between the fleet and the shore. At Delagoa Bay the British admiral sent messages a distance of 80 miles to the fleet off shore. The British

of the messages were sent overland a distance of 60 miles. There are ten sets of instruments in Lord Roberts' army, and these have been developed successfully. All scientific questions and experiments made by a rapidly moving army are of necessity scantily reported by a commander in the field, and the accounts of the tests with the wireless telegraphy are still quite vague.

One important improvement in the system in war times was made through the co-operation of the hero of Mafeking. The difficulty of sending messages any great distance in a mountainous country like South Africa was overcome by the invention of a system of kites by Baden-Powell. In order to make wireless telegraphy successful it is necessary to raise the wire attached to the instrument to a considerable distance in the air. Thus to telegraph 60 miles the elevation of the wire should be at least 100 feet above the surface. It was often impossible to find any way to secure this altitude for the wires, but by using the kites the problem was easily solved. Kites of the Baden-Powell type consequently became inseparably associated with the wireless telegraphy in South Africa, and it was by this means that messages were sent a distance of 60 miles.

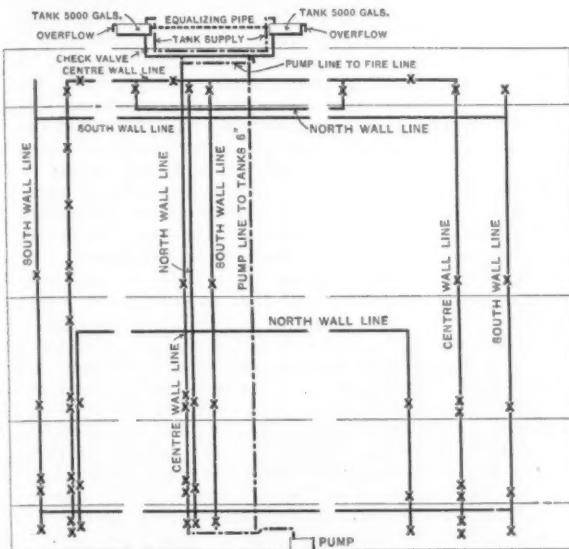
Signor Marconi expressed himself satisfied with the experiments made in the war, and so far as the reports have been received they are nearly all favorable in their results. Both the British and Italian navies have adopted his system, and others are experimenting with it for the purpose of using it should it prove satisfactory, including the United States Navy. In the meantime

some of the big transatlantic steamship companies are using the system, and one of the inducements offered their patrons is of communicating with friends on shore long before the steamers reach port. Several hours are saved in this way on both sides of the Atlantic in receiving the latest news of the day which may have transpired on two continents while the passengers were on the sea.

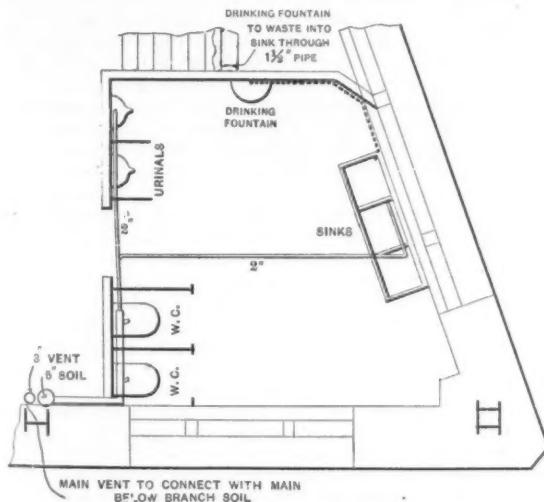
## Lake Ore Matters.

DULUTH, MINN., August 19, 1900.—Crowded lower lake receiving docks are having some effect on shipments, but these are showing little change since the month set in.

The Mesaba mines that were flooded last week have overcome the difficulty and are again at work. The



*Fig. 6.—Elevation Showing Fire Protection System and Water Supply to Plumbing System.*



*Fig 8 - Plan of Toilet Rooms in Boiler Department.*

## HYDRAULIC ENGINEERING IN THE METROPOLITAN POWER HOUSE.

Fayal is particularly liable to trouble from surface water, as it has a mammoth open pit covering many acres and lying in a depression, from which are openings into the underground portion of the mine. Last week this pit filled so fast that before the men were fairly out their steam shovels and locomotives were almost buried, and by morning there was 100 feet of water in the pit. It will be some time before all this can be pumped. The water came down like a cloudburst. All the steam shovel and open pit mines were seriously affected by this storm.

pit mines were seriously affected by this storm. The Carnegie Company have taken over the lease of the Ohio mine belonging to the Lake Superior Consolidated Mines and will hereafter operate it. There is a minimum of 100,000 tons annually and the mine is a large one. It lies between properties now held by the

Carnegie interests and gives them the Shaw, Mesaba Mountain, Lone Jack, Norman and Ohio in the Virginia group. The Norman is idle and the Shaw never has been opened. There is a total of 400 acres in these five mines and an enormous body of medium grade ore. Now that the Duluth & Iron Range road has completed its track to the new Fay property it has been discovered that there is no ore in the shaft that was being sunk there and it has been abandoned. A new one will be started. In the meantime the road, built under pressure from the mine owners to get to the property at the earliest possible day, will wait for its traffic.

Among the old mines of the eastern Gogebic that Corrigan, McKinney & Co. have been reopening and de-

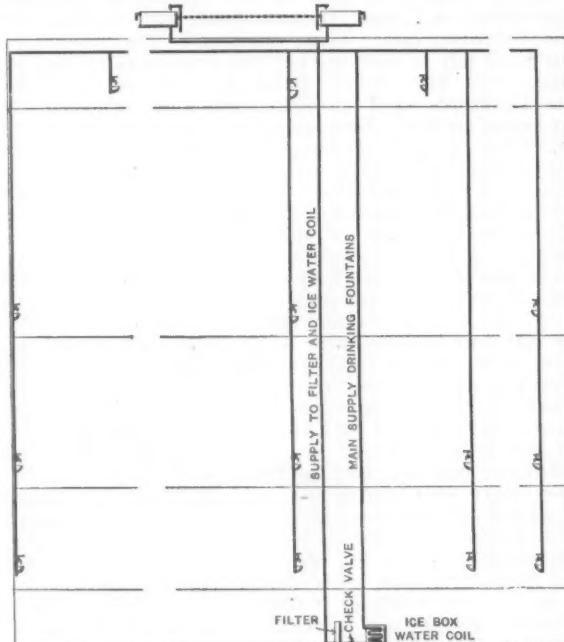
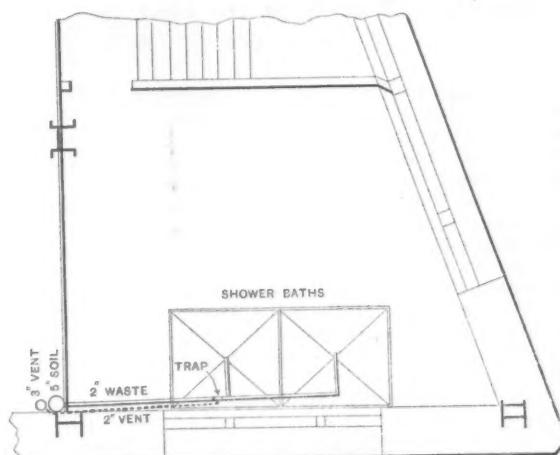


Fig. 7.—The Ice Water System.



*Fig. 9.—Plan of Shower Bath and Locker Rooms.*

veloping this year the Ironton is showing up splendidly and is likely to have a large body of ore. At the various old properties around Colby which this concern are operating there is likely to be a possible tonnage of 400,000 tons a year for many years to come. Drill holes sunk in the Mesembria district have been abandoned on account of the quality of the ore and the machinery has been moved to Wakefield, where the Carnegie interests are working. Shipments off the range are ahead of any year and it has all along looked as if more than 3,000,000 tons would be moved. But there is a cessation of stock pile work, and at the Colby, Newport, Tilden, Mikado, Palms, Brotherton and Sunday Lake mines these are untouched now. Many of these will reduce their working forces materially during this month.

Of all the recently revived towns on the Marquette range Michigan alone seems not to suffer. There the Cleveland Cliffs Company are operating the Michigan, Imperial and Webster mines and show no signs of decrease; on the contrary, are increasing the forces employed. Shipments have commenced from the first named mine and ore is coming up both day and night. About 500 tons a day is now sent out. Both Imperial and Webster are shipping. It is stated that there is not a single vacant dwelling, or even room, in the village. Holsting has been resumed at the Negaunee mine for the first time since the accident of early summer. There is something like 300 feet of water yet in the mine, but the management are now lowering it. The Princeton has not closed and will not, it is stated, but the Star West, at Palmer, is idle. It will remain so all season. The village of Palmer is again dead, both the Star West and Volunteer mines being quiescent. The former mine has been left in such shape that a resumption can take place with little delay. Some 40 men are working at the Hartford, at Teal Lake. Machine buildings, &c., are being erected. The Beaufort mine is now being prepared for energetic mining by the Bristol Mining Company. Shipments have commenced and much new machinery will be installed. The Jones & Laughlin property at Iron Mountain Lake is showing better with depth and as the workings run under the lake. If the property becomes a mine of importance it will be necessary to drain this lake, as Lake Angeline was drained, by pumping. It will be a large undertaking.

At the Florence mine, Menominee range, they have 130,000 tons in stock and no ore sold, and have, therefore, reduced the force sharply. The Commonwealth, that has been mining from pillars for some time, has about reached the end and will be abandoned with this year if nothing new is found. Ore has been discovered on the Wisconsin side of the Menominee River, near Faithorne Junction, and the Pembina Creek Mining Company have been formed to explore. They are getting a satisfactory showing of lean ore, which is improving with depth. The Huron Iron Company, operating Columbia mine, are to explore lands between Crystal Falls and Mansfield mine, where indications are good.

In the past week 70 50-ton cars have been ferried to Michipicoton for the Clergue Company, operating the Helen mine, and shipments are now about 4000 tons a week. No mine ever did such work as this in its first season, and that this one can is an indication of the ease of handling the hematite quarry there, described in *The Iron Age* two weeks ago.

D. E. W.

### The Paris Meeting of the Iron and Steel Institute.

The autumn meeting of the Iron and Steel Institute will be held at Paris on Tuesday, Wednesday, Thursday and Friday, September 18, 19, 20 and 21. The president, Sir William Roberts-Austen, will deliver an address, and the following papers have been promised for reading:

"On the Development of the Iron and Steel Industries in France Since 1889," by H. Pinget, secretary of the Comité des Forges de France.

"On Iron and Steel at the Paris Exhibition," by Professor H. Bauerman, Ordnance College, Woolwich.

"On American Methods of Testing Iron and Steel," by Albert Ladd Colby, South Bethlehem, Pa.

"On the Washing of Iron Ore," by Alfonso Dory, Bilbao.

"On Rolling Mills," by Louis Katona, Resicza, Hungary.

"On the Constitution of Slags," by Baron H. von Jüptner, Nonawitz, Austria.

"On a New Method of Producing High Temperatures," by E. F. S. Lange, Manchester.

"On the Action of Aluminum on the Carbon of Cast Iron," by Godfrey Melland, B.Sc., Assoc.R.S.M.; and H. W. Waldron, Mason University College, Birmingham.

"On a Microchemical Research on Iron and Phosphorus," by J. E. Stead, Member of Council.

Tuesday and Wednesday will be given over to sessions and visits to the Exposition. Thursday is reserved for the Vincennes annex. On Thursday evening two excursions will start, one to St. Chamond works, near St. Etienne, and the other to the Hayange plant of the Petits Fils de F. de Wendel.

**The Norton Grinding Company.**—There have been organized at Worcester, Mass., the Norton Grinding Company, with a capital of \$10,000. Many of the stockholders are identified with the Norton Emery Wheel Company. The management is in the hands of Milton P. Higgins, president; George J. Alden, treasurer; John Jepson, Charles L. Allen and Charles H. Norton. The

latter has been for several years engaged with the Brown & Sharpe Mfg. Company on the work of bringing out their universal and plain grinders. The business of the new company will be to do machine grinding. Firms who are not fully equipped for grinding operations can send their grinding jobs to the new company and have them done cheaper and better than in any other way. They are also prepared to furnish estimates on ground parts complete when so desired. It is stated that for this work stronger, heavier and better machines are required than are in the market at the present time, and they shall bring out machinery for the purpose. If the machines prove successful with them and there is a demand for them they will probably place them on the market.

### Central Pennsylvania News.

HARRISBURG, August 20, 1900.—There is no doubt about the existence of a better tone in the iron and steel circles of this district. Manufacturers are satisfied that the worst is past, and that from now on there will be less to disturb them. They say that already there has been an improvement in prices along certain lines, and that with the resumption of active operations in September much of the uncertainty that has prevailed during the summer will pass away. Most of the concerns in this section report increased orders and many inquiries, but while waiting for the adjustment of prices they expect orders will be placed somewhat grudgingly for the present. In every instance *The Iron Age* representative found confidence in the general situation. Conservative manufacturers agree that there is plenty of business held in abeyance, and that as soon as it is once recognized that the low notch of prices has been reached orders will pour in from all directions. As a matter of fact all the plants here and in this belt have been unusually busy for midsummer. It is true that the enforcement of contracts has been found difficult, but where specifications are withheld on account of the high figures at which the contracts were placed the manufacturer is getting even on concessions in other ways, so that in the end there has not been serious embarrassment on this score. It is doubtful whether in any period of the iron and steel business there has been so much repudiation of contracts. They are broken on the slightest pretext, and manufacturers realize that legal enforcement of such contracts would, in the end, prove disastrous to the general situation. All are apparently satisfied to let things take their course and await developments.

The Harrisburg Boiler & Mfg. Company are having a most prosperous season, and the plant has been in steady operation day and night. Large shipments have recently been made to South Africa, Peru, Mexico and other far distant points of pipe and other materials for irrigation plants, electric power plants and other like enterprises. The domestic business of the company is also large.

The Harrisburg Foundry & Machine Works have more than they can do. If it was possible to take orders for instant delivery they could easily double their capacity and still not be able to supply the demand. Fortunately most of the recent orders are for reasonable deliveries, and there is plenty of business in sight to keep the large plant in steady operation the rest of the year. Among recent orders are engines of different types for the Gate City Cotton Mills of Atlanta, the Pennsylvania Railroad ferry boats, the New York, New Haven & Hartford station building, at Hartford; the J. P. & W. S. Pyle Company, manufacturers of Pearline, and others. There has been no reduction of the force, and with the increased orders there seems to be no question about plenty of business months ahead.

There is some trouble over the wages of puddlers in this district, but it has not affected the rolling mills in this immediate locality.

The Bellefonte Furnace Company will resume operations September 12. The company's furnace has been entirely remodeled and the output will be large.

One of the Paxton furnaces is in blast, but unless the iron market improves it is doubtful about the other going on at present.

A portion of the plant of the Susquehanna Iron & Steel Company is in operation, and there is an increased demand for certain products.

The American Iron & Steel Company's mills, at Lebanon, are all running, and there is an abundance of work with good prospects.

There is no falling off in orders at the Pennsylvania Steel Works. While this and all other plants are suffering somewhat from the readjustment, the various departments are all busy. Some large orders have recently been booked. A hurry order of 50 tons of special steel blooms for Copenhagen, Denmark, is now being shipped from the works.

The Chesapeake Nail Works will probably resume operations in September.

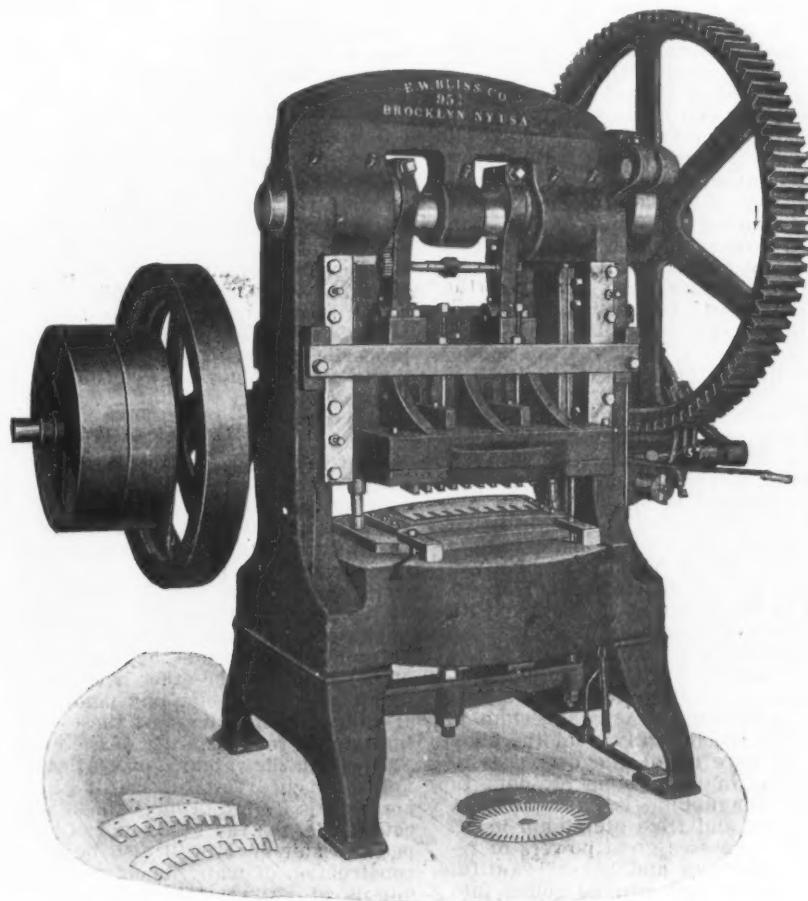
### The Bliss Double Crank Press for Armature Disks.

In the accompanying half-tone we illustrate the latest type of double crank press especially adapted for the rapid production of armature disks and segments. In position in the press will be seen a compound die for cutting at each stroke of the press one complete segment, as shown at the left hand side of the press on the floor. As it is an essential feature of armature disks and segments to have the outside and inside segments exactly concentric, it has been found best to adopt dies like the one shown, which, by cutting the edges simultaneously, eliminates the inaccuracies which are almost unavoidable when the cutting is done in two or more operations. Some complete disks for smaller generators, also punched at one stroke of this press, are shown in the foreground. In order to facilitate the operation of the press, it is provided with throw out pads for the upper die, which work in a positive manner and consume but little power. The press is also provided with a direct connected knockout

sible on vessels carrying cotton. The total ballast room on such ships is estimated to be 100,000 tons per year. The regular sea freight from America to Hamburg amounts to \$6.43 per ton. On account of these high freight expenses and the consequent difference in price, the import of American pig iron into Upper Silesia is impossible, Silesia itself having very large iron and coal mines and furnaces. The large industrial works on the Elbe, however, at Dresden, Magdeburg and Hamburg—perhaps also at Berlin—would be good markets, as they have no iron ores in their district. According to analyses made here, the American pig iron is said to be superior to the Upper Silesian. An order of 100 tons of American foundry pig iron has been given to the Tennessee Coal, Iron & Railway Company; but this is only to be considered as a trial order.

### A New Alloy.

A new alloy has recently been invented and patented by Guilliam H. Clamer and Joseph G. Hendrickson of



THE BLISS DOUBLE CRANK PRESS FOR ARMATURE DISKS.

for the lower die, actuated by the movement of the slide in connection with the two rods attached to the cross head under the bed of the press. Presses like this one are made in a large number of sizes. As shown, it is of the following dimensions: Distance between uprights, 40 inches; distance between gibs, 35 $\frac{1}{4}$  inches; standard opening in bed, 32 inches round; distance from bed to slide when up, 12 inches; standard stroke of slide, 2 inches; adjustment of slide, 1 inch; size of fly wheel, 45 x 6 inches; weight of fly wheel, 1100 pounds; proportion of gearing, 1 to 7 $\frac{1}{2}$ ; floor space, legs, about 46 x 67 inches; weight complete, as shown, 15,500 pounds. This press has been built by the E. W. Bliss Company, 11 Adams street, Brooklyn, N. Y.

**American Pig Iron in Silesia.**—C. W. Erdman, consul at Breslau, Silesia, reports as follows on July 10: Under present conditions, the import of pig iron into Upper Silesia would not be profitable. The freight from America to Hamburg amounts to \$4.05 per ton, the freight thence to Upper Silesia \$3.09, and the import duty to \$2.38, which would be an expense of \$9.52 on each ton. The local market value of pig iron is from \$4.28 to \$4.76 lower than the price of American pig here. But even the low charge of \$4.05 for sea freight can be reckoned on only when the iron is loaded as ballast, which is pos-

Philadelphia, who have assigned the patent to the Ajax Metal Company of that city. The alloy is employed in making composition castings and consists of lead, tin and nickel in substantially the following proportions: Lead, 45; tin, 45, and nickel, 10, and it is used by melting it along with copper or copper bearing material in the proportion of, for example, 1 part of alloy to 10 parts of copper, more or less. An alloy embodying the invention may be made as follows: Nickel is added to tin. However, the nickel is readily soluble in melted tin, so that the amount which may be added depends only on temperature and time given for the solution. The temperature required is only a red heat, and is far below the melting point of nickel. After the tin has absorbed the requisite amount of nickel the lead is added to form the finished product. It is then cast in suitable molds in bars of convenient size.

**Carborundum Ladle Stoppers.**—Stoppers and nozzles for steel ladles, we are informed, are being manufactured of carborundum and have been used experimentally with considerable success. The carborundum is mixed with clay and treated in practically the same manner as those articles made of plumbago. They are hard, smooth and of excellent appearance. These stoppers and nozzles were made under patents of Benjamin Talbot.

## Magnalium.

The following exceedingly interesting description of a new alloy, composed of aluminum and magnesium, has been specially translated for *The Iron Age* from *Neueste Erfindungen und Erfahrungen* of Vienna, Austria, it being, therefore, understood that the prices stated are European and not American prices:

Aluminum was first produced by Wöhler in 1827, but, owing to the complex processes necessary to recover even a small amount of it, no attention could be paid to its possibilities in the arts. Only after the methods of manufacture had been greatly improved by St. Clair Deville was its worth recognized, and "clay silver" became known as the "metal of the future." Napoleon III was most zealous in fostering the industry founded by Deville.

The metal was worth at first 3000 francs, per kg., but the price soon fell to 200 francs and lower. To-day, owing to the use of electrical furnaces, it can be bought for about 28 cents a pound. In spite of its low price no one can say that aluminum has fulfilled all the hopes that were cherished for it. It is, of course, the lightest of all useful metals, but its superiority in this particular is counterbalanced by lack of strength and by the fact that it is only worked with considerable difficulty. It cannot be readily filed, turned or planed into shape. It is too soft for many purposes and is not so firm as iron. Besides, its color is not particularly pleasing, being dull bluish and hard to polish. Its use in the manufacture of fancy goods is, hence, quite limited.

Numerous attempts have been made to improve the quality of aluminum by alloying with other metals. The alloys so far discovered possess more or less excellent properties, but they contain only a small percentage of aluminum, and thus the most remarkable quality of the latter, its lightness, is destroyed. Of these alloys aluminum bronze contains 10 per cent. and aluminum brass 3.3 per cent., and when cast only 1 per cent. of aluminum. The specific gravity of these alloys, in turn, is 7.65, 8.33 and 8.35, against 2.68 for pure aluminum. Alloys have been made with the other metals, but only a few possess any useful qualities, aluminum bronze being the single alloy of technical importance.

Attempts at finding a magnesium alloy met with negative results, the compound being brittle and undurable. Wöhler was the first, also, in this field, but after him no further experiments were made until a short time ago. Now Dr. Ludwig Mach has come forward with an alloy which he calls magnalium. His success is to be attributed to the fact that he worked with pure materials. Magnalium is essentially different from all other technically important aluminum alloys. While the latter contain only a small percentage of aluminum, magnalium is composed of 70 to 98 parts of aluminum and 2 to 30 parts of magnesium. As magnesium is lighter than aluminum, the specific gravity of the alloy is lower than that of the pure metal and decreases in indirect ratio to the amount of magnesium present. In its other properties, also, magnalium is different from alloys previously discovered, and from aluminum itself. It is hard, easily worked, possesses great powers of resistance to atmospheric influences and has a beautiful appearance. It is also ductile and can be rolled into tubes and wire just as well as aluminum.

According to the amount of magnesium present in the alloy the properties of magnalium vary considerably. With 10 to 25 per cent. of magnesium the alloys are easily worked. A 10 per cent. alloy possesses the same mechanical properties as zinc. An alloy of 100 parts of aluminum and 15 parts of magnesium corresponds to good casting brass, while with the same amount of aluminum and 20 parts of magnesium the metal possesses the properties of hard drawn brass wire.

For making castings a magnalium containing 10 to 15 per cent. of magnesium is especially suited. It melts at about 700 degrees (C.), remains hot for a long time, and fills out even the most delicate details of the mold in a faultless manner. It is true a rather considerable funnel shaped cavity forms at the gate, but this may be counteracted by a larger sink head. The casting is dense and free from blow holes, and the surface remains so bright that pickling is not necessary. Magnalium, indeed, possesses a magnificent color. It is almost silvery white, acquires a vivid luster by polishing and may even be rendered reflective. The color and gloss are not affected by the atmosphere or by water, excepting, possibly, that a dull film forms on the surface, but the resistance to tarnishing increases with the purity of the magnesium and the aluminum.

The castings may be worked in the same manner as brass. Long spiral shavings may be turned off and even the finest threads be cut. It can be bored and worked with the finest drills, and filing may be done without the files becoming clogged or filled up, as happens in working pure aluminum. Especially the softer alloys—

i. e., those containing less magnesium (10 to 15 parts of magnesium to 100 parts of aluminum)—may, when cold, be forged, drawn into wire and rolled out into tubes and plates. While aluminum castings possess hardly the tensile strength of cast iron (per square inch), at 3 per cent. elongation the strength of the alloy containing 10 to 20 per cent. of magnesium is, according to the tests conducted so far, 30 to 42 kg. per sq. mm. (42,000 to 60,000 pounds per square inch), with an elongation of 10 per cent. The strength of the alloy is, therefore, considerable, and it increases with the proportion of magnesium; at the same time, however, the alloy becomes more brittle. When we add, further, that magnalium can, according to the experiments previously conducted, be soldered, just as well, at least, as the pure aluminum, we have probably included all of the advantages under consideration which belong to the new alloy, the most important of which are the ease with which it can be worked, its strength and its beautiful color.

For many purposes it is desirable to raise the melting point of the alloy (which lies near 700 degrees C.) without, however, interfering with its other valuable properties. This is only partially and unsatisfactorily accomplished by adding copper, tungsten, chromium and nickel, for, although these additions make the alloy harder to melt, they render it at the same time heavier and much more brittle. On the other hand, the melting point is raised in a surprising manner by the addition of a very small amount of antimony. A pure aluminum-magnesium alloy is a thin liquid at dark red heat, and continues in this form also when the surface begins to shine like quicksilver. Upon adding a piece of antimony to such a red hot alloy in a crucible it becomes at first viscous in the neighborhood of the dissolving antimony, and the area of this action increases according to the amount of antimony used until the whole mass becomes doughy and can no longer be stirred. The mass does not melt nor is all the antimony dissolved until white heat is reached. This alloy can be cast only at white heat. The castings show the same mechanical properties as pure magnalium and are not porous. Antimony gives, therefore, a means of raising the melting point of the alloy without interfering with its properties, which are so unusually valuable. It is true that the melting point of pure aluminum is raised by the addition of antimony, yet in this case 25 per cent. of antimony is necessary. The alloy of aluminum with 25 per cent. of antimony melts at red heat, while an alloy of 100 parts of aluminum and 20 parts of magnesium has its melting point raised to such an extent by the addition of only 10 to 15 per cent. of antimony that it does not melt until a white heat is reached.

We are able, therefore, on the one hand, by varying the amount of magnesium, to obtain alloys having very different properties and applicable to the greatest variety of uses, and, on the other hand, by the addition of antimony, to vary the melting point between certain limits at will. It is obvious that these facts are of very great importance for the utility of the alloy.

Through the valuable properties of magnalium a wide field is opened for the use of aluminum. Of first importance is its use in mechanical work of the more delicate kinds, for the needs and objects of which it is especially suited. It will also be of great service in the construction of many machines, since its great strength admits of its use for such purposes, while the most notable quality—its extreme lightness as compared with other metals—plays a principal part.

The production of any desired quantity of aluminum no longer presents any difficulty, as is shown by the present price of pure aluminum, which is 250 marks per 100 kg. (about 28 cents a pound). Magnesium costs about seven times as much (1800 marks per 100 kg., or over \$2 per pound). This is not, however, for technical reasons, but only because there is very little demand for pure magnesium. Magnalium, therefore, costs—if we use these prices and do not take account of the cost of alloying, patent rights, &c.—608 marks (about 62 cents per pound) in the case of 30 per cent. magnesium and 452 marks (39 cents per pound) in the case of 15 per cent. magnesium.

This, indeed, is considerably higher than the cost of copper or brass, but the difference in price is less noticeable if we consider at the same time the quantities. In this case, if we take the price of copper at 1.50 marks per kg. (16 cents per pound), we find that 100 marks will buy 7.48 liters (or \$1 will buy 19.5 cubic inches) of copper, while the same sum will buy 7.1 liters (or \$1 will buy about 17.2 cubic inches) of the alloy containing 30 per cent. magnesium. Moreover, we may expect with perfect certainty that the price of pure magnesium, thanks to the increased demand and greater effort along the line of its production, will decrease considerably, especially as there is no difficulty whatever in securing the raw material. Then magnalium will take its place in common use side by side with the ordinary copper alloys, even in cases where lightness is not the only consideration.

**The Philadelphia Pneumatic Hand Rammer  
for Foundry Use.**

The Philadelphia Pneumatic Tool Company of Philadelphia are manufacturing a hammer which is designed to do a large variety of work in the foundry. In construction it is similar to that of the heavier type of pneumatic rammers, but still is light enough to be easily handled by the operator. It is at the same time heavy enough so that its inertia absorbs any vibration that may arise from the rapid reciprocation of its piston and rammer head. The valve mechanism and parts are as simple as is consistent with smooth working, and are suitably inclosed and therefore free from dust and dirt. The rammer head is a hexagon and can be turned at the will of the operator. The weight of this tool is 45 pounds and it strikes 250 to 300 blows per minute, with an air pressure of 50 to 100 pounds per square inch, only 15 cubic feet of free air per minute being used when in con-



**THE PHILADELPHIA PNEUMATIC HAND RAMMER  
FOR FOUNDRY USE**

tinuous operation. The air is admitted to the handle on the right side, its admission being controlled by a throttle lever under the thumb of the user; the exhaust passes through the handle on the left. Speed and force of the blow can be varied at will. A number of different shaped heads are provided with each machine. These are attached to the rammer rod by means of a taper fit, and may be changed in less than half a minute and without letting go of the handle.

Besides regular foundry work, these rammers have been found satisfactory for ramming up converter bottoms in Bessemer steel plants, and have been adopted by many large plants of this kind.

A school has been established by the Government at Fort Monroe, Va., for the purpose of instructing regulars in the application of electrical machinery used in the army. The rules, published by direction of the Secretary of War, provide that applicants must be under 25 years of age, unmarried, qualified as a gunner, a student of a correspondence school or the owner of electrical books, and no applicant will be recommended unless he has sought for a year or more to become practically familiar with one or more classes of electric machinery or with some portion of the elementary literature on electricity.

**Acetylene for Lighting.**

Before the Civil Engineers' Society of St. Paul, A. Lipschutz delivered a paper on "The Use of Acetylene in Railway Station and Train Lighting," which contains a good deal of information of general interest. We quote from it the following:

Calcium carbide is now made by fusing 100 parts of lime and 70 parts of coke in an electric furnace. The material used for the manufacture of carbide must be of great purity; the lime should contain, on an average, 99 per cent. of CaO, and the coke should not run over 5 per cent. of ashes. The lime and the coke are crushed to nut size, then ground to powder in mills, and finally screened. The materials are then weighed and mixed; the latter process is continued for at least five minutes for the sake of uniformity. The mixture is then introduced into the electric furnace and fused under the electric arc. When cold and broken into pieces, carbide has the appearance of granite, and is equal to it in hardness. A temperature of 2700 degrees C. is required for its formation. As carbide absorbs moisture from the air very greedily, it must be protected, in transit as well as in storage, from the influence of the atmosphere. It is therefore shipped in air tight packages, and, when kept above ground in a dry place, there is absolutely no danger connected with its storage. Carbide, manufactured as above, is an almost pure product. For manufacturing purposes, one mechanical horse-power is required for a yearly output of 1.1 tons of carbide. Carbide is sold at present, in carload lots, at \$68 per ton, with strong indications of a reduction in this price as soon as rival capital shall compete in this field.

The most objectionable impurity in carbide is magnesium, which, while melting, takes up nitrogen from the air and forms magnesium nitrate. Such carbide, when in contact with water, gives out a gas rich in ammonia, which, if not washed out of the gas, will clog up gas pipes and burners and produce smoking.

Barthelot first made definitely known the true composition of acetylene as 92.3 carbon and 7.7 hydrogen, with a density of 0.92. If carbide is placed in contact with a small quantity of water it will not generate pure acetylene gas, as the heat developed by its generation will allow the acetylene to polymerize, and the result will be a gas rich in benzene, naphthaline and other polymers, which lower the candle power of the gas and cause it to vary with each instant, as the lighting, under such circumstances, is done with benzene vapor instead of acetylene gas.

Acetylene is colorless, and when pure and dry it has a special, not entirely disagreeable, smell, as it is neither acrid nor corrosive; when hot and moist, however, the odor changes, as it contains then the products of polymerization.

The temperature of inflammation is about 400 degrees C., and its temperature of combustion about 2000 degrees C. It therefore has nearly two and one-half times greater heat of combustion than illuminating gas per cubic foot, but for equal amounts of light it gives out very much less heat than illuminating gas. It needs 12½ volumes of air for its complete combustion. The fear of acetylene as a poisonous gas was dispelled several years ago, as it has been conclusively shown by very extensive experiments that its toxic qualities are less than those of coal gas. There has been a universal belief that this gas attacks metals, and especially copper, and forms with them explosive combinations; and even so learned a man as Professor Lewes mentioned in one of his lectures that, on account of this property, copper must not enter into the construction of an acetylene gas generator, only to declare a few months later, after hearing of the Pintsch Gas Company's experiments, that his position with regard to the use of copper and brass in connection with acetylene gas had been erroneous.

Acetylene gas becomes liquid under about 700 pounds per square inch of pressure at ordinary temperature. At 37 degrees C., which is the critical point for acetylene gas, it requires a pressure of 1000 pounds per square inch to liquefy it. When this temperature is passed no pressure will convert it into a liquid state.

Acetylene gas, when heated to 1432 degrees F., will dissociate, and, when not compressed to more than 30 pounds per square inch, the dissociation is confined to the point where the heat is applied, and thus no explosion occurs. When, however, it is subjected to a pressure of more than 30 pounds and heated to the dissociating point, a violent explosion follows, resulting in the destruction of the containing receiver. Acetylene gas not compressed cannot be exploded by shock, heat or concussion. A pipe leading from a gasometer filled with acetylene gas was heated to a white heat about 5 feet from the gasometer, and while local dissociation of the gas at the heated point took place, no explosion could be produced. The shock of a bullet shot through a tank filled with 150 pounds compressed acetylene gas also

failed to produce an explosion. The crushing of a receiver, filled with acetylene gas compressed to 150 pounds, under a ram weighing 600 pounds and falling 20 feet, produced neither explosion nor ignition. Acetylene, like every other combustible gas, forms, with air, an explosive mixture, and a room or building containing an acetylene gas generator must be well ventilated, in order to allow for a proper exit of gas leaking from the generator.

As already stated, acetylene has a great density, and a receiver, such as a gas bell, for instance, open on top, will retain gas several days if the gas is not blown out by a current of air. Hence no repairs requiring soldering or heat should be attempted at an acetylene gas generator until all traces of gas have been expelled from the apparatus. Non-observance of the two rules just stated has been the cause of nearly all acetylene gas explosions in practice.

As the carbide commercially manufactured is never chemically pure, it introduces impurities in the gas, of which the principal ones are ammonia, phosphoreted hydrogen and sulphureted hydrogen. It is due to the two last mentioned impurities that acetylene gas has a disagreeable garlic like smell, which disappears whenever these impurities are removed. With few exceptions, chemical purification of acetylene gas has thus far not been resorted to in this country, for which the following reasons might be briefly stated:

The commercial carbide, as furnished to consumers in the United States, is of greater purity than the similar article in Europe. A second and probably more valid reason is that very few attempts have been made in this country to burn acetylene with mantles as in incandescent gas lighting; in which case it has been found that the organic sulphur and phosphorus compounds of the unpurified gas would break down the mantles, thus making a chemical purification of this gas compulsory. Besides washing the gas free of ammonia, which is now done in connection with nearly all modern generators, the elimination of other impurities might be accomplished by three different processes—viz. (1) passing the gas through chromic acid, (2) the use of bleaching powders and (3) the application of acid copper salts.

A comparison of the different qualities of rays given out by the several light sources is stated as follows:

Coal gas gives out a weak light, with yellow rays; destroys colors, heats the air and has strong toxic qualities. It is weak in diffusive power.

Electric arc light has pale, sickly, violet rays, but is very intense. It is, however, the least diffusive of all lights, and is therefore rapidly being supplanted by other and more diffusive lights.

Incandescent electric light has reddish rays, mixed with yellow, and is fatiguing to the retina, but gives out little heat.

Incandescent gas light is too often rich in greenish rays.

Acetylene gives pure white rays; does not change colors; is least fatiguing to the retina; has but slight toxic qualities, and, being the most diffusive of all lights known, approaches most nearly sunlight. It has 11 times greater illuminating power than coal gas.

When carbide is placed in contact with water, gas is immediately generated. The different ways in which these two substances may be brought together have given rise to an apparently countless number of generators, all of which, however, may be classified under three different methods of generating this gas—namely:

1. Water drips or flows to the carbide.
2. Water rises to the carbide from below.
3. Carbide is dropped or thrown into a large body of water.

The generators of the first system are mostly used for small experimental and portable apparatus, such as headlights and bicycle lamps. The high temperature of generation incident to bringing a comparatively large quantity of carbide together with a small quantity of water results in the product of a heated, and therefore impure, gas, for which reason such apparatus is unsuitable for any large installation. In another construction of this type of generator water flows through a pipe onto the carbide, which is stored in a receptacle, which in its turn is connected with a gasometer. When gas is generated the bell in the gasometer rises, and when in its highest position closes a valve in the water pipe, thus stopping further generation of gas.

Still another form of generator has a closed carbide receptacle immersed in a tank of water, and a water supply pipe leading from the carbide receptacle into the tank. Water pours in through this pipe and onto the carbide until the pressure of the gas rises sufficiently to drive back or hold back the water in the supply pipe. This type of generator has, besides the above mentioned defects, the disadvantage that, in the absence of an especially large gasometer, the generation of gas, after the water supply is cut off, may raise the pressure in the pipes and generator to a dangerous degree. In the gen-

erator mentioned, sticking of the water valve or failure of the levers or other means for opening this valve may also result in a dangerous rise of pressure.

Generators of the second system are constructed on the following principle: In a tank filled with water is inserted a bell, free to move up and down on guides. The carbide receptacle is hung inside of the bell, and when the bell is in its lowest position water flows through holes or sieves in the bottom of the carbide receiver. Gas is instantly generated, and its pressure raises the bell, and with it the carbide receiver, thus lifting the carbide supply away from the water and stopping further generation. There are in use numerous modifications of this method, of which one may be mentioned in which the carbide remains stationary, while the water surface is acted upon by the gas pressure, alternately rising to and receding from the carbide, according to the demands of the machine. This entire class of generators is open to the same objection as the class first considered. They also continue to generate gas when water is removed from the carbide.

The third class of generators operates by throwing or dropping a small charge of carbide into a closed tank filled with water. The gas thus generated bubbles through the water, and is led to a gasometer which is large enough to accommodate the amount of gas which the small charge produces.

The charge introduced in the generator falls on a grating, and, being surrounded by a large mass of water on all sides, generation takes place with but little rise in temperature. The gas, by rising in bubbles to the surface of the water, is washed, and contains only traces of ammonia.

With gas produced by this class of generators it is impossible to stop up pipes and burners, as the ammonia and other tar forming ingredients have been washed out of the gas by its upward passage through the water. From such a generator, which has been in active use part of the day, evenings and nights for over two years, we have taken out pipes close to the generator, and also some near the burners, but all that could be found was some white spots like frost, due to lime being carried with the gas from the generator, and nearly all along the pipes the original scale of iron was to be seen; and in the brass pipes of the chandlers we could find no deposits or signs that the metal had been affected. Such testimony has been corroborated by other disinterested parties in this country and Europe to such a degree as to make it advisable to consider for use in our plans only apparatus constructed on the third principle—namely, that by which small charges of carbide are introduced by hand or automatically into a large body of water. It is fully realized that a large amount of capital is invested in the manufacture of apparatus of the first and second systems, and the abandonment of these classes of generators will therefore be made unwillingly and slowly; but the future belongs, without doubt, solely to the generators of the third system.

As the charging and cleaning of generators are the only items of expense for labor connected with an acetylene gas installation, it becomes of importance that, with automatic machines, such as are used in smaller installations, a rather large machine be used. For instance, in a plant requiring 50 lights for three hours daily the consumption of gas would be approximately 90 cubic feet per day, necessitating a generator capable of holding 18 pounds of carbide. As there is generally, in a passenger station or freight depot, a man to be found whose duties will permit him to spend an hour in charging and cleaning the machine, it will be seen at once that a generator holding, for instance, 54 pounds of carbide would require attention only about twice a week for a couple of hours, and such attention can be given without seriously interfering with the attendant's other duties. The limit in size for an automatic machine is reached in a generator capable of holding a charge of 100 pounds of carbide. This would supply practically 150 lights for three hours.

When an installation requires more than 200 lights it would appear best to use a machine charged by hand, and employ an attendant for the sole purpose of taking care of the plant. This is by far the safest and most satisfactory way of generating, and there is no doubt that for all larger installations, and also for village and town plants, such a system, with a hand fed generator in connection with a liberally proportioned gas holder and a proper system of piping, will prove more economical and less liable to accidents than an installation with a number of automatic machines.

As before stated, there is at present in the market no generator which delivers a thoroughly dry gas, and it becomes therefore of the utmost importance, in piping for acetylene, to follow out the rule that all pipes must dip from the burner back to the generator, in order to free themselves from moisture and condensation, which otherwise will surely freeze up in the pipes and prevent the gas from reaching the burners.

It is self evident that the generator room must be kept moderately warm all the year round, in order to prevent the water in the generator from freezing. There is no danger from the proximity of a stove or heater. The charging and cleaning of the generator is to be done by daylight, and no artificial light must be permitted in the generator room when the machine is open, as, for instance, in charging.

A burner consuming 1 foot of acetylene gas per hour will yield from 45 to 50 candle power, whereby it will be understood that the piping for acetylene can be of much smaller size than for coal gas. It is, however, not advisable to use a smaller size than  $\frac{3}{8}$ -inch pipe. Common burner cocks, such as are used for ordinary illuminating gas, answer very well.

With reference to burners, it must be stated that good burners are still very expensive. Cheap burners are an everlasting source of trouble, and necessitate constant renewals. The only burner which has been found to work satisfactorily with acetylene gas is constructed on the following principle: The gas, before issuing from the burner, is divided into two tiny streams, so diverted as to form between them an angle of about 90 degrees. These streams impinge on each other, flatten out and form the flame, which is here not in direct contact with the burner, and thus an accumulation of carbon at the burner and a stopping up of the gas hole is prevented. All-lava burners are preferable to metallic burners with

by the acetylene plant has reduced the cost per ton of freight handled, and no other system of lighting could be installed at that place which would rival it in economy.

We have now a number of passenger stations and freight depots equipped with acetylene plants in operation, and several others under construction, ranging from 20 to 60 lights each, and in no case has an acetylene plant been decided upon except where, by its smaller operating cost, its independence of rented sources of light and its fine illuminating qualities, it has shown itself to be superior to other systems of lighting.

Acetylene in train lighting is by no means a newcomer. It has been in use for the last six years in England, Germany and France, in connection with several different systems. The standard system of lighting trains of the Prussian State railroads, and also of some of the largest railroads of England and France, consists of carrying in gas tanks under coaches a mixture of Pintsch gas and acetylene compressed to 10 atmospheres, or about 150 pounds. The experiments of the Pintsch Gas Company showed that the illuminating power of their gas was doubled when mixed with 20 per cent. of acetylene. The fact was also established that an explosion will not occur when a tank containing this mixture, compressed to 150 pounds, is heated to the dissociating point of pure acetylene.

Acetylene, when stored under a pressure of not more than 30 pounds, cannot produce a dangerous explosion when heated to the dissociating point, and the system of lighting suburban trains having short runs with pure acetylene carried in tanks under cars at 30 pounds pressure has been in successful operation for several years.

This system of low pressure storage is, however, inadequate for long distance trains, and in order to use acetylene stored at the same pressure as in the system of the Pintsch Gas Company, this latter company made tests with acetylene stored under 150 pounds pressure; first in a tank having riveted seams, and then in their own standard tank, which has riveted and soft soldered seams. When the tank with riveted seams was heated to the dissociating point, or about 1432 degrees F., an explosion took place which demolished the tank. In the second test, with their own tank, having soft soldered seams, the solder commenced to melt when a temperature of about 380 degrees F. was reached, thereby springing a leak by which the gas escaped, burning out quietly without any injury to the tank.

It was therefore concluded that acetylene under 150 pounds pressure stored in such a tank could be carried safely even in case of an accident by which the car might be overturned and the wreck catch fire. As already mentioned, there are no means of exploding a tank filled with acetylene gas at high pressure except by heating it to or above a temperature of 1432 degrees F., as neither shock nor concussion will produce an explosion.

There appeared, however, another reason why the use of acetylene under higher pressure than 30 pounds was finally abandoned by the Pintsch Gas Company, and their system retained by which a mixture of Pintsch gas and 20 per cent. acetylene is used compressed to 150 pounds.

#### The Lavigne Self Opening and Adjustable Die Head.

#### THE LAVIGNE SELF OPENING AND ADJUSTABLE DIE HEAD.

lava tips, although, if proper care is taken when applying the latter, good service can be had from them also. While we have burners under observation which, after two years' service, are still in good condition, it is not safe to figure the life of an average burner as more than one year. They should be tested before applying, for capacity as well as for efficiency, as it is not an uncommon occurrence to find in a gross of burners 10 per cent. unfit for use.

Before concluding this part of the paper, given over to a description of the use of acetylene for station lighting, it may be of interest to have some details of a plant in practice. The Great Northern Railway has at Hamline a freight transfer house, which consists of a warehouse about 800 feet in length, having loading platforms at each side for the entire length of the building. The offices are located at one end of the structure. There are altogether about 100 burners, of which 26 are in the office, while the rest of them are grouped in three rows; one row being in the center of the freight house, and the other two rows on the platforms. The generator is installed in a small building about 20 feet distant, which also serves as a dinner room for the men. The office lights burn all night, while the lights in the freight house and platforms are needed for about four hours daily in the winter. The generator is a 100-pound carbide machine, and is charged every other day. The cost per lamp hour (22 candle power) varies from 0.55 cent. to 0.65 cent., according to the amount of gas used. This includes attendance, depreciation and renewals. Formerly the lighting was done with kerosene lamps. Aside from the fact that it required the exclusive services of more than one man to fill, trim and clean 100 oil lamps daily, the light furnished by these lamps was found to be insufficient to do the required work. The light furnished

The self opening die head shown is made with three or four threading dies and is designed for use on turret head and screw cutting machines. It is dust proof and cannot be clogged by chips. It is graduated upon one side of the shell and the graduated ring is controlled by two small nuts on the back end of the ring. By loosening them slightly the ring may be turned around to any desired size within the limit of graduation. As the die head has three or four single cutting edges on the dies the latter may be hobbed with a hob slightly larger than the work required. The friction will therefore be eliminated, as they are adjusted to the required size. Both left and right hand dies may be hobbed and used in the same die head. It also can be used on a rotary as well as on a turret or stationary slide. The dies may be thrown open either by the adjusting block on the inside or by the lever on the outside. Any desired length may be cut with this die head, as the dies can be opened and closed by the small lever on the periphery of the adjusting ring.

The dies are opened and closed in the following manner: The outer shell is provided with bevel and circular cams which operate on the extreme end of the dies and are directly over the cutting of the dies, thereby obviating all tendency of the dies to spring outward. This self opening die head, of course, does away with the reversing of the machine to run out the work. It is manufactured by the Hoggson & Pettis Mfg. Company of New Haven, Conn.



## Iron Ore in 1899.

### A Summary of the Report of John Birkinbine to the United States Geological Survey.

WASHINGTON, D. C., August 21, 1900.—The annual report of the United States Geological Survey upon the production of iron ore in the United States for 1899, compiled by John Birkinbine, has been completed, and through the courtesy of the director the correspondent of *The Iron Age* is enabled to present the following abstract:

The production of iron ore in the United States in the year ending December 31, 1899, amounted to 24,683,173 tons, which was 5,249,997 long tons, or 27 per cent., in excess of the previous maximum of 19,433,716 long tons in the year 1898. The records of 1898 and 1899 represent the maxima of iron ore mined in any country in one year, the nearest approach to these being a total of 18,062,049 long tons won in the year 1880 in England. The augmented production was principally from the States of Minnesota and Michigan, the former being credited with an increase of 2,197,780 long tons and the latter with 1,799,311 long tons over the 1898 output.

The amount of pig iron manufactured in the year 1899 was 13,620,703 tons, and if all the ore mined in the United States in that year had been smelted in the production of this pig iron it would show that 1.81 tons of iron ore were required to make a ton of pig iron, but allowance must be made for the difference in the stocks of ore, the foreign ore imported, the ore used for other purposes than for pig iron manufacture and the other iron bearing material fed to the furnaces. If to the amount mined in 1899 is added the decrease in the stocks or ore on hand at the mines, the amount of foreign ore imported, &c., the grand total sent to the consumers will approximate 26,000,000 tons.

The output of iron ore in the United States for the years 1889 to 1899, the period during which data were systematically collected by the United States Geological Survey, was as follows: 1889, 14,518,041 long tons; 1890, 16,036,043; 1891, 14,591,178; 1892, 16,206,666; 1893, 11,587,629; 1894, 11,879,679; 1895, 15,957,614; 1896, 16,005,449; 1897, 17,518,046; 1898, 19,433,716; 1899, 24,683,173. Total for 11 years, 178,507,234 long tons. From this it will be seen for 11 years the average product has been 16,227,930 tons per annum. In the years above mentioned—viz., 1889 to 1899, inclusive—when 178,507,234 long tons of iron ore were mined, 101,141,857 long tons of pig iron were smelted, representing an average of 1.76 tons of domestic ore mined per ton of pig iron made.

The iron ores of this country have been subdivided into the following general classes:

1. Red hematite, being all anhydrous hematite, specular, micaeuous, fossil, slate iron ore, martite, blue hematite, &c.

2. Brown hematite, including the varieties of hydrated sesquioxide of iron, recognized as limonite, gothite, turgite, bog ores, pipe ores, &c.

3. Magnetite, those ores in which the iron occurs as magnetic oxide and including some martite, which is mined with the magnetite.

4. Carbonate, those ores which contain a considerable amount of carbonic acid, such as spathic ore, blackland, siderite, clay iron stone, &c.

The red hematites continue to be the most prominent of the classes of iron ore, contributing 20,004,399 long tons, or 81 per cent. of the total of 1899. But while this was an increase of 3,854,215 long tons, or 24 per cent., over the 1898 output, the percentage of the total iron ore mined represented by the red hematites decreased from 83.1 per cent. in 1898 to 81 per cent. in 1899.

Of the brown hematites 2,869,785 long tons were won, which was 11.63 per cent. of the iron ore mined in the United States, as against 1,989,681 long tons, or 10.2 per cent., in 1898, and represents an advance over 1898 of 880,104 long tons, or 44 per cent.

The magnetite product amounted to 1,727,430 long tons, or 7 per cent. of the total for the United States, as against 1,237,978 long tons, or 6.4 per cent., in 1898, an increase of 489,452 long tons and an advance of 40 per cent.

The balance, 81,559 long tons, or 0.33 per cent. of the iron ore produced in the United States, was of the carbonate variety, as against 55,373 long tons, or 0.3 per cent. of the total for 1898, showing an increase of 26,186 tons, or 47 per cent.

From this it will be seen that there was a general increase in the amounts of all the different classes, due to active demand upon local mines to supplement ore obtained from large producers. Quite a number of iron ore deposits which had not been wrought for years resumed operations in 1899, and in some instances exploitations will be continued. The advantages to blast

furnaces of at least a partial local supply of ores and the application of improved mining methods will probably encourage working some of the deposits which during the business depression were inactive.

Michigan is the largest producer of red hematites, followed in order by Minnesota and Alabama. Virginia heads the list as a source of supply for brown hematites, Alabama and Tennessee taking second and third places respectively. Pennsylvania produced the largest amount of magnetite, followed by New York and New Jersey, while Ohio contributed the greatest amount of carbonate ore.

The following figures show the production by States of the different varieties of ore during 1899:

Red hematite: Michigan, 8,863,942 long tons; Minnesota, 8,161,289 tons; Alabama, 1,911,097 tons; Pennsylvania, 38,331 tons; Virginia and West Virginia, 17,173 tons; Tennessee, 298,705 tons; Wisconsin, 531,636 tons; New York, 45,503 tons; Colorado, 12,327 tons; Georgia, 57,000 tons; Nevada, New Mexico, Utah and Wyoming, 11,541 tons; Kentucky, 35,384 tons; Missouri, 20,472 tons; total, 20,004,399 tons.

Brown hematites: Michigan, 44,645 long tons; Alabama, 751,846 tons; Pennsylvania, 152,468 tons; Virginia and West Virginia, 968,143 tons; Tennessee, 333,342 tons; Wisconsin, 48,162 tons; New York, 31,975 tons; Colorado, 295,230 tons; Georgia, 179,748 tons; Nevada, New Mexico, Utah and Wyoming, 6850 tons; North Carolina, 10,788 tons; Connecticut and Massachusetts, 29,611 tons; Missouri, 2248 tons; Texas, 14,729 tons; Total, 2,869,785 tons.

Magnetite: Michigan, 237,570 long tons; Pennsylvania, 815,771 tons; Virginia and West Virginia, 1160 tons; New York, 344,159 tons; New Jersey, 256,185 tons; Nevada, New Mexico, Utah and Wyoming, 35,757 tons; North Carolina, 36,828 tons; total, 1,727,430 tons.

Carbonate: Pennsylvania, 2757 long tons; New York, 22,153 tons; Ohio, 53,221 tons; Maryland, 3428 tons; total 81,559 tons.

Total, Michigan, 9,146,157 long tons; Minnesota, 8,161,289 tons; Alabama, 2,662,943 tons; Pennsylvania, 1,009,327 tons; Virginia and West Virginia, 986,476 tons; Tennessee, 632,046 tons; Wisconsin, 579,798 tons; New York, 443,790 tons; Colorado, 307,557 tons; New Jersey, 256,185 tons; Georgia, 236,748 tons; Nevada, New Mexico, Utah and Wyoming, 54,148 tons; Ohio, 53,221 tons; North Carolina, 47,616 tons; Kentucky, 35,384 tons; Connecticut and Massachusetts, 29,611 tons; Missouri, 22,720 tons; Texas, 14,729 tons; Maryland, 3428 tons. Grand total, 24,683,173 tons.

Considering the production of the different classes of iron ore for the period of 11 years during which the United States Geological Survey has collated statistics, it is found that the red hematite mines have furnished about three-fourths of the total, followed in order by those producing brown hematite, magnetite and carbonate ore. The amounts of each variety mined in the United States were as follows: Red hematite, 16,150,684 long tons; brown hematite, 1,989,681 tons; magnetite, 1,237,978 tons; carbonate, 55,373 tons; total, 19,433,716 tons.

Notwithstanding the active demand in the year 1899 the output of magnetite is but slightly above the maximum of 1891. The amount of brown hematite won was greater in 1889, 1890 and 1891 than in 1899, and prior to 1895 the quantity of carbonate ores annually mined exceeded the record of 1899.

In addition to the iron ore mined there was 65,010 long tons of zinc residuum or clinker produced, which was utilized in the production of spiegeleisen. There was also an increased production of concentrated magnetic iron ore, the amount reported in 1899 being 94,217 long tons, as against 38,434 long tons in 1898. Rolling mill cinder and scale, silicate of iron, copper residuum, &c., are also used in charges for blast furnaces to a limited extent.

Owing to the fact that most of the iron ore mines make contracts with the consumers in the early portion of the year, the prices for iron ore did not show such a marked advance in the year 1899 as they will in the year 1900, when the miners participated to a greater degree in the increased demand and good prices for iron and steel. It is possible, also, that the control by steel manufacturers of a large proportion of the important mines may exert a controlling influence on the sales and the shipments of ores from the Lake Superior mines to distributing ports on the lower lakes.

#### Lake Superior.

The Lake Superior region increased its former maximum output of 13,779,308 long tons in 1898 to 17,802,955 long tons in 1899. These figures are those of production and not shipments, for the latter are considerably in excess for 1899, owing to the fact that stock piles at the mines were reduced during the year. The amounts mined from the various ranges during the past two years were as follows: Marquette, 1898, 2,987,930 tons; 1899, 3,634,596 tons; Menominee, 1898, 2,275,064; 1899, 3,281,422; Gogebic,

bic, 1898, 2,552,205; 1899, 2,725,648; Vermillion, 1898, 1,125,538; 1899, 1,643,984; Mesaba, 1898, 4,837,971; 1899, 6,517,305; total, 1898, 13,779,308; 1899, 17,802,955.

With the exception of the Gogebic all of the ranges mined their maximum product in the year 1899, the Gogebic reaching its greatest total in the year 1892. Considering the ranges in the order of their product in 1899, the Mesaba range, with its rich, easily mined ores, is first with a total of 6,517,305 long tons. The Marquette range, the one first opened, continues to furnish a large proportion of the output of the Lake Superior region, 3,634,596 long tons being the record for 1899. This range has shown a continued increase since 1894. The Menominee range reached the 3,000,000 mark for the first time in 1899, when it contributed 3,281,422 long tons. The Gogebic range, though a constant producer, mining 2,725,648 long tons in 1899, has not equaled its 1892 output, when 3,058,176 tons were mined, nor even the 1890 total. The Vermillion attained its maximum of 1,643,948 tons in 1899.

#### MICHIGAN.

Michigan continues to hold first place as a producer of iron ore, and the only State which is likely to contest this position in the near future is Minnesota. The amount contributed by Michigan in 1899, 9,146,157 long tons, was 37.1 per cent. of the United States total, practically the same proportion as in 1898, when but 7,346,846 long tons were mined. The increase on the 1898 record was 1,799,311 long tons, or 24.5 per cent. Of the 1899 product 8,863,942 long tons, or 96.9 per cent., was red hematite; 237,570 long tons, or 2.6 per cent., magnetite, and 44,645 long tons, or 0.5 per cent., brown hematite. The State ranked first as a producer of red hematite, fourth in the list of magnetite producers and eighth in the supply of brown hematites. The total value of the 9,146,157 tons of ore mined was \$13,707,899, or \$1.50 per ton. This is the value for the ore at the mine, not including transportation.

Owing to the great demand for iron ores some deposits which had been classed as abandoned, or were temporarily inactive, were again exploited and exploration work was quite active. Lean Bessemer ore and also some relatively high phosphorus ores were shipped, which in previous years could not have been marketed, but these aided in swelling the total production of the State in 1899. The semi-centennial celebration of the Cleveland Cliffs Company, at Ishpeming, emphasizes the marvelous development which has made the Lake Superior region famous. The Cleveland mine was one of the pioneer enterprises which in 50 years has resulted in a mining industry unequaled in the history of the world.

#### MINNESOTA.

All of the 8,161,289 long tons of iron ore contributed by Minnesota was of the red hematite variety, in which class the State occupies second place, with the same rank in the list of producers. The increase was 2,197,750 long tons, or 36.9 per cent over the 1898 total of 5,963,509 long tons.

On both the Mesaba and Vermillion ranges exploration work has been carried on, and the claim is made that the reserves on the Mesaba range represent double the quantity of iron ore which has been mined from the Lake Superior region in its history of 50 years. The use of steam shovels at some of the large deposits of the Mesaba range, and the prominence given to these by published articles, has resulted in a widespread opinion that most of the Mesaba ore is won in this way. Such, however, is not the case, for some of the large producers win the ore from underground exploitations.

The handling of the stripping and of the ore by steam shovels at the important mines has reached a degree of perfection which is most creditable. A record of 6000 tons of ore dug and loaded by one machine in nine hours indicates what can be done under favorable conditions, but it would be unfair to gauge a season's work by this or by shorter records when from 9 to 12 tons per minute were placed upon cars.

#### ALABAMA.

A total of 2,662,943 tons of iron ore contributed by this State in 1899 gave it third place as a producer, this amount being 261,195 tons, or 10.9 per cent., in excess of the quantity mined in 1898. Of the 1899 total 1,911,097, or 71.8 per cent., was red hematite, and 751,846, or 28.2 per cent., brown hematite. Alabama occupies third position as a producer of red hematite and second rank as a miner of brown hematite.

In the construction of the water works tunnel through Red Mountain, near Birmingham, Ala., the various seams of iron ore that are mined in the district were cut through at a depth of 150 feet below the crest of the ridge, and the foot and hanging walls penetrated. The uppermost seam was the Ida seam, 6 feet in thickness, underneath it 25 feet of lean ore and sandstone; then

the Irondale seam, 3 feet thick, then 41 feet of red sandstone with slate partings; then the Big seam, sometimes called the Eureka or Ishkooda seam, 21 feet thick, and under this the reddish sandstone, and, finally, bluish slates and magnesian limestone to the base of the hill. Of these three seams the Ida is not worked at all, the Irondale is not worked southwest of Red Gap, and the Big seam is not worked northeast of Grace's Gap, which is 4 miles southwest of the tunnel.

The Irondale seam, worked by the Sloss Iron & Steel Company, northeast of Red Gap, affords the best soft red ore on the mountain, the average content of metallic iron being about 52 per cent., but the alumina is also above the average for the district. One of the companies in the district striving for a supply of soft red ore have undertaken to use the lower bench of the big seam below Grace's Gap. The upper 10 feet have long since been removed and now the other part of the seam is to be taken, although the metallic iron will not exceed 40 per cent. and the lime is very low.

Dr. Phillips summarizes the ore situation in the Birmingham district as follows: "The cheap soft red ore, carrying from 45 to 50 per cent. of iron, and comparatively free from lime, is nearly exhausted; more and more of the limy ore, which costs more to mine and more to smelt, is being used, and there is a great and pressing demand for brown hematite ores to take the place of the soft red ores."

#### PENNSYLVANIA.

In 1899 Pennsylvania increased the 1898 total of 773,082 long tons by 236,245 long tons, or 30.6 per cent., reaching a production of 1,009,327 long tons. All four classes of ore were mined, 815,771 long tons, or 80.8 per cent., being magnetic, chiefly from the Cornwall ore mills; 152,468 tons, or 15.1 per cent., brown hematite; 38,331 tons, or 3.8 per cent., was hematite, and 2757 tons, or 0.3 per cent., carbonate. The State occupied first position as a miner of magnetite, sixth place as a producer of brown hematite, eighth rank in supplying red hematites and fourth as a contributor of carbonate.

#### VIRGINIA AND WEST VIRGINIA.

West Virginia mined but a small quantity of ore in 1899, but to preserve the confidential nature of the statements this has been included in Virginia report, but practically all of the ore is to be credited to the latter State. In 1899 these States contributed 986,476 long tons, being 410,763 tons, or 73.7 per cent., greater than the 1898 output of 557,713 tons. They take first rank as brown hematite producers, with a total of 968,143 long tons, or 98.1 per cent. of the nation's output. The balance, 17,173 tons, or 1.8 per cent., was red hematite, and 1160, or 0.1 per cent., magnetite.

#### TENNESSEE.

Tennessee's total of 632,046 long tons gave it sixth position in 1899, when it augmented its 1896 product of 593,227 tons by 38,819 tons, or 6.5 per cent. Of the amount mined 333,342 tons, or 52.7 per cent., was brown hematite, and 298,704 tons, or 47.3 per cent., red hematite, the State occupying respectively third and fifth rank in these classes of ore.

#### WISCONSIN.

The 1898 output of Wisconsin, 509,645 tons, was increased 70,153 tons, or 13.8 per cent., in 1899, reaching a total of 579,798 tons and giving the State seventh position. Of this total 531,636 long tons, or 91.7 per cent., was red hematite, obtained chiefly from the Gogebic range of the Lake Superior region, in which class it occupied fourth rank, and 48,162 tons, or 8.3 per cent., brown hematite, giving it seventh place in this variety of ore.

#### NEW YORK.

New York was the only State, except Pennsylvania, which mined all four varieties of iron ore in 1899. Of the total of 443,790 long tons, 344,159 tons, or 77.6 per cent., magnetite; 45,503 tons, or 10.2 per cent., hematite; 31,971 tons, or 7.2 per cent., brown hematite, and 22,153 tons, or 5 per cent., carbonate ores. In the different classes of ore New York occupied respectively second, seventh, ninth and second position. The increase, 263,839 tons, was nearly one and one-half times the 1898 output of 179,951 long tons.

#### COLORADO.

Colorado's total in 1899 of 307,557 long tons gave it ninth place as an ore producer, being a decrease of 10,923 long tons, or 3.4 per cent., from the 318,480 tons contributed in 1898. Of the amount mined in 1899, 295,230 long tons, or 96 per cent., was brown hematite, and 12,327 tons, or 4 per cent., was red hematite. The deficiency in Colorado's production was largely influenced by the opening of the ore deposits in Wyoming and New Mexico, for the use of the blast furnaces of the Colorado Fuel & Iron Company, and by the use of liberal amounts of lead ores from Idaho in the Colorado silver smelters.

**New Jersey.**

New Jersey's contribution in 1899 was 256,185 long tons of magnetite ore, in which class it occupied third position. This was a decrease of 19,253 long tons, or 7 per cent., from the 1898 output of 275,438 tons. The expense of mining some of the New Jersey ores and the necessity of roasting or concentrating the mineral interferes with the exploitation of its mines, but there are liberal ore reserves which, if properly prepared, may contribute to a local supply for nearby furnaces at prices per unit of iron below the cost of ore brought from Lake Superior or imported from foreign countries.

**Georgia.**

This State supplied 236,748 long tons of iron ore in the year 1899. Of this amount 179,748 tons, or 7.9 per cent., was brown hematite, and 57,000 tons, or 24.1 per cent., red hematite, giving it sixth place in each of these classes of ore. This production shows an increase of 157,623 long tons, or 24.1 per cent., over the 79,125 tons mined in 1898, when Georgia and North Carolina were reported together. In the summer of 1899 S. W. McCallie, Assistant State Geologist, made an examination of the brown hematite ores of Georgia, which are found mainly in the northwestern part of the State, in what is known as the Paleozoic area. He reports that the ores occur chiefly in the Lower Silurian, but are also found associated with the Carboniferous and the Cambrian deposits, the most abundant deposit of the Lower Silurian being in the Knox Dolomite series. The more extensive mining operations are confined mainly to Polk and Bartow counties.

**Other States.**

None of the remaining States mined 100,000 tons in 1899. Nevada, New Mexico, Utah and Wyoming contributed red and brown hematite and magnetite ore. Ohio's output was all of the carbonate variety, in which class it occupies first place. North Carolina mined brown hematite and magnetite, Kentucky red hematite, Connecticut and Massachusetts brown hematite, Missouri red and brown hematites, Texas brown hematite and Maryland carbonate ores.

Active exploitation of the red hematite deposit near the Platte River, in Northeastern Wyoming, was inaugurated in 1899, but the railroad connection to Sunrise was not completed until the spring of 1900. It is probable that Wyoming will rank as an important producer of iron ore in the report for 1900.

**Valuation of Iron Ores.**

The total value at the mines of the 24,633,173 long tons of iron ore produced in the year ending December 31, 1899, as reported by producers, was \$34,999,077, or \$1.42 per long ton; an increase of 28 cents, or 24.6 per cent., over the average value of \$1.14 per ton, as given in 1898. The highest average value placed on iron ore at the mines is for the State of New Jersey, where the expense of mining is considerable, or the ores do not have long hauls to reach the blast furnaces; they therefore command a higher price per ton at the mine than many other ores. The lowest average cost, 90 cents per ton, was in Texas, where a portion of the iron ore is obtained by convict labor.

W. L. C.

**Pacific Coast News.**

SAN FRANCISCO, CAL., August 13, 1900.—The export trade has assumed large dimensions in iron, steel and hardware with the Orient and that trade has hitherto been principally transit, the goods merely passing through San Francisco on their way to their destination. The retaining of that trade by New York, or Chicago, or the manufacturing center, depends almost altogether on a close study of what is suited to the necessities of the people of these countries. We cannot for any long time force our goods on them unless we take heed of these peculiarities. Otherwise some other people will step in and supply what we fail to do. Thus in the case of Japan, the people of the country themselves will learn all they can from us and then start in to supply their own markets. For instance, in the matter of nails we, or rather the East, used to ship large quantities to the Japanese markets in transit, but this shipment has in a great measure ceased, because the Japanese are making their own nails. I know that some of the nails prepared for the Japanese market—I will not say where—were complained of as being unsuited to the wants of the Japanese consumers.

The subject matter of transportation is somewhat complicated by the necessities of the Government, which takes, willy nilly, vessels for the transportation of troops and supplies, much to the discomfort of our merchants and manufacturers. Still, I see that the New York, San Francisco & Hawaiian Steamship Company have their cards abroad. This will be a 60-day voyage and

will render competition very keen at this end in respect of the merchandise from Atlantic ports destined for the Pacific Coast. It will also have the effect of interfering more or less with the trade of the Middle West and the Pacific Coast, as it will tend to throw trade more directly to the merchants and manufacturers of the Atlantic Coast. It will, too, help Pacific Coast jobbers, as it will enable them to sell their goods further East and capture back some of the territory that has been wrested from them by the jobbers of Chicago, St. Louis and Kansas City. Almost everything is tending in this direction now. A new steamship line has placed us in quick communication with Europe, and, as it carries on a brisk competition with the Pacific Mail Steamship Company, has already effected a large increase in trade with the ports of South America in some particular directions, but not in hardware, iron or steel. In these sections Europe has long had the lead and doubtless must continue to keep it for quite a while, inasmuch as her merchants study better the condition of trade in these countries. Our merchants here, however, are looking more sharply after these matters than they were wont to and no doubt some trade in this line will start up ere long. At present flour, wheat, canned fruits and vegetables, canned salmon, oysters, lobsters, lumber and such goods make up the staples of the new trade, but orders for goods to supply blanks in stock will doubtless come along and these may be followed by others. It is simply a question of competition between American and foreign manufacturers and the best man will win the day. But here are several thousand miles of coast and the country back of it opened up to American enterprise and I do not see any reason why the merchants of San Francisco and others concerned should not make at least as good a showing as they do in the Orient and in the same articles, as they have a similar competition to contend with. The China steamers have carried as much as \$200,000 worth of merchandise—single cargoes—where not over \$40,000 was either of California origin or shipped by California merchants. The balance was all Eastern divided up between cotton, domestics and manufactures of iron and steel. This new German line is not the only one that will compete on this route, but the old line between Panama and the South American ports is about to put on a line of steamers to San Francisco, so that there will be ample tonnage and rates reasonable enough to allow of the development of this trade. There are 12,000,000 people on the line followed by these steamers.

The shipments from this port to the Orient by the steamship lines have fallen off of late. They used to average about \$190,000 per steamer and some even exceeded the sum of \$200,000, but since the Chinese troubles they have fallen off considerably. As far as the hardware and metal interests are concerned, however, there is not so much cause of complaint as the falling off has been principally in raw cotton and domestics, as the last steamer did not carry a pound of either commodity. But bicycles, machinery, typewriters, hardware, sewing machines, were largely represented, as also were wire, agricultural implements, safes, scales and other goods of a similar description. The shipments to the Hawaiian Islands continue as brisk as ever, although, being a part of the United States, their quantities and values cannot be as easily determined as previously. But the demand for machinery, merchant iron, pumps for irrigation, iron pipes and general hardware is as good as before.

The mill men's strike in this city, Oakland and Santa Clara County, which is for eight hours instead of nine, and which is on to-day, bids fair to affect other interests seriously. There are thousands of men in the building trades who will be idle if the strike continues, and this will affect temporarily the sale of building hardware. It is to be hoped that the strike will not be of long duration.

J. O. L.

**Horse-power of Machinery at Paris Expositions.**—Under date of July 14, 1900, Consul-General Guenther of Frankfort says: "The modern demand for high power machinery is shown by a comparison of the machinery exhibited at the last four world's expositions at Paris. In 1867 there were exhibited and operated 52 engines, with an aggregate of 854 horse-power; in 1878, 41 engines aggregating 2533 horse-power; in 1889, 32 engines, with 5320 horse-power, and in 1900, 37 engines, with 36,085 horse-power. The average horse-power per engine exhibited in 1867 was 16; in 1878, 62; in 1889, 170; and in 1900, 973—a most startling increase. France this year exhibits and operates 18 engines, with an aggregate of 14,435 and an average of 802 horse-power. Other countries operate 19 engines, with 21,650, or an average of 1140 horse-power.

It is reported that two Bertrand Thiel open hearth steel plants are being built in England, one at Brymbo and the other at Round Oak.

## Machine Tools and Supplies for the Navy.

Bids were opened at the Navy Department last week for machine tools and supplies as follows:

### Boston Navy Yard.

Bidder 1, New Haven Mfg. Company, New Haven, Conn.; 2, S. A. Woods Machine Company, Dow street, South Boston, Mass.; 3, American Tool Works Company, Cincinnati, Ohio; 4, Industrial Works, Bay City, Mich.; 5, Prentiss Bros. Company, Bridge street, Worcester, Mass.; 6, U. Baird Machinery Company, Pittsburgh, Pa.; 7, Wheatley Bros., Washington, D. C.; 8, Putnam Machine Company, Fitchburg, Mass.; 9, the Fellows' Gear Shaper Company, Box 45, Springfield, Vt.; 10, W. E. Clark, 8 Oliver street, Boston, Mass.; 11, Walter H. Foster, New York City; 12, Ward & Huntington, 14 Stone street, New York City; 13, Manhattan Supply Company, 160 Duane street, New York City; 14, Prentiss Tool & Supply Company, 115 Liberty street, New York City; 15, J. V. Wetherbee, Boston, Mass.; 16, V. R. Browning, 819 Western Reserve Building, Cleveland, Ohio; 17, Hill, Clarke & Co., 150 Oliver street, Boston, Mass.; 18, F. H. Lovell & Co., 118 John street, New York City; 19, Park Steel Company, Box 75, Pittsburgh, Pa.; 20, Carnegie Steel Company, Pittsburgh, Pa.; 21, S. B. Vrooman Company, 1135 Beach street, Philadelphia, Pa.; 22, John I. Brady, 612 Bourse Building, Philadelphia; 23, Chas. Este, Twentieth and Glenwood avenue, Philadelphia; 24, Mitts & Merrill, Saginaw, Mich.; 25, Duke & Smith, Norfolk, Va.; 26, Manning, Maxwell & Moore, 85 Liberty street, New York; 27, Bullard Machine Tool Company, Bridgeport, Conn.; 28, Berlin Machine Works, Beloit, Wis.; 29, Bowles & Wild Company, 93 Pearl street, Boston, Mass.; 30, Eureka Fire Hose Company, Box 1330, New York City; 31, American Wood Working Machine Company, 136 Liberty street, New York City; 32, Manhattan Rubber Mfg. Company, 23 South Charles street, Baltimore, Md.; 33, New Jersey Car Spring & Rubber Company, Jersey City, N. J.; 34, Worth Bros. & Co., Cortlandt street, New York City; 35, U. T. Hungerford Brass & Copper Company, 121 Worth street, New York City; 36, Fairbanks Company, 311 Broadway, New York City; 37, Drew Machinery Agency, Manchester, N. H.; 38, Randolph-Clows Company, Waterbury, Conn.; 39, Brown Holsting & Conveying Machine Company; 40, Pratt & Whitney Company, 144 Pearl street, Boston, Mass.; 41, J. B. Kendall, Washington, D. C.; 42, Barber & Ross, Washington, D. C.; 43, R. C. Hoffman & Co., Box O, Baltimore, Md.; 44, Geo. W. Knowlton, 1 Custom House street, Boston, Mass.; 45, American Tube Works, 157 Milk street, Boston, Mass.; 46, Austin & Dotin, 102 North street, Boston, Mass.

Class 1. One key seating machine—Bidder 26, \$430; 14, \$449; 24, \$462; 11, \$465; 37, \$538.

Class 2. One gear planing machine—Bidder 9, \$1292.

Class 3. One horizontal boring, drilling and milling machine—Bidder 26, \$4170, \$4200 and 3780.

Class 4. One vertical eight-spindle multiple drill—Bidder 17, \$1074; 40, \$1199; 26, \$1200.

Class 5. One 60-inch boring and turning mill—Bidder 27, \$2495; 3, \$2675; 40, 26, \$2195, \$2780 and \$2450.

Class 6. One 18-inch slotting machine—Bidder 8, \$2450; 26, \$2575 and \$2475.

Class 7. One 2-inch improved automatic bolt cutter—Bidder 3, \$407.52; 36, \$432.80; 8, \$450; 6, \$463; 26, \$480; 37, \$482.50 and \$374.

Class 8. One 12-inch swing engine lathe—Bidder 3, \$163; 5, \$200.60; 26, \$216; 17, \$219; 36, \$222.50; 8, \$225.

Class 9. One No. 3 centering machine—Bidder 14, \$82; 17, \$83; 6, \$84; 37, \$86; 26, \$98; 1, \$125; 11, \$125; 40, \$335.

Class 10. One 15-inch improved shaping machine—Bidder 14, \$245; 6, \$276; 17, \$79; 37, \$294.50; 26, \$275, \$290 and \$250; 3, \$284.15; 8, \$335; 40, \$335; 11, \$375; 36, \$395.

Class 11. One improved universal tool and cutter grinder—Bidder 11, \$215; 36, \$325; 26, \$333 and \$240; 40, \$346.

Class 12. Two 28-inch vertical drills—Bidder 26, \$370; 5, \$380 and \$500; 40, \$403; 1, \$452; 17, \$454; 36, \$463.50; 3, \$537.80; 8, informal.

Class 13. One arbor press—Bidder 26, \$112; 36, \$112.50; 6, \$117.50; 40, \$118.70; 17, \$118.75; 14, \$118.75; 11, \$118.75.

Class 14. Three universal radial drills—Bidder 5, \$2700; 26, \$3150 and \$3525; 3, \$3332.25; 36, \$3368.25; 37, \$3690 and \$3555.

Class 15. One dove-tailing machine—Bidder 36, \$630.

Class 16. One combined jointing, edging and timber ripping saw—Bidder 2, \$690.

Class 17. One triple drum sander—Bidder 28, \$1250; 2, \$1475; 31, \$1550.

Class 18. Steel angle bars—Bidder 20, \$18,608.55; 10, \$18,827.34; 43, \$20,309.61.

Class 19. Steel plates—Bidder 41, \$12,068.05; 20, \$12,161.54; 34, \$12,906.36 and \$12,532.21; 43, \$13,506; 10, \$13,831.82; 46, \$14,388.83; 19, \$19,958.73.

Class 20. About 20,000 pounds seamless drawn copper piping—Bidder 13, \$5948.53; 45, \$6004.13; 35, \$6062.49; 18, \$6176.15; 38, \$6215.48.

Class 21. 10,000 B. M. hewn teak—Bidder 23, \$13,000; 15, \$13,750; 21, \$13,900; 7, \$17,000; 25, \$15,750.

Class 22. 1400 lineal feet of rubber lined, double jacketed, cotton fire hose—Bidder 30, \$826; 12, \$870; 13, \$882; 44, \$854; 29, \$906.50; 32, \$910; 33, \$980; 22, \$1358.

Class 23. One locomotive crane, 10 tons capacity—Bidder 16, \$4950; 4, \$4990 and \$7290; 39, \$6305.

### Washington Navy Yard.

Bidder 1, Mayo & Rohrer Company, 220 Broadway, New York; 2, Bradford Belting Company, 201 Walnut street, Cincinnati, Ohio; 3, Chas. Este, Twentieth and Glenwood avenue, Philadelphia; 4, Bement, Miles & Co., Twenty-first and Callowhill streets, Philadelphia; 5, Chas. A. Schieren Company, 47 Ferry street, New York; 6, Page Belting Company, Concord, N. H.; 7, Ward & Huntington, 14 Stone street, New York; 8, Graton & Knight, Worcester, Mass.; 9, Jas. Balphe, 200 Trenton avenue, Wilkes-Barre, Pa.; 10, Hudson Belting Company, Worcester, Mass.; 11, U. Baird Machinery Company, Pittsburgh; 12, M. P. Duvall, Norfolk, Va.; 13, Penn Bridge Company, Beaver Falls, Pa.; 14, Wm. D. Gill & Son, Baltimore, Md.; 15, Cuyler & Mohler, Boston street, Baltimore, Md.; 16, Dan A. Lowber, 45 Dey street, New York City; 17, National Leather Belting Company, 7 Ferry street, New York City; 18, J. B. Kendall, Washington, D. C.

Class 1. White oak—Bidder 3, \$1485.76; 19, \$1784; 14, \$2824.35; 12, \$3768.

Class 2. One gun lathe—Bidder 4, \$23,400.

Class 3. Wrought iron pipe—Bidder 15, \$418; 9, \$446.10; 18, \$489.50; 1, \$500.40.

Class 4. Iron screws—Bidder 7, \$38.

Class 5. Georgia pine—Bidder 3, \$328.70; 14, \$456.31; 12, \$788.88.

Class 6. Best poplar—Bidder 14, \$180.54; 3, \$235.66; 12, \$601.80.

Class 7. White pine No. 2—Bidder 14, \$373.50; 3, \$390; 12, \$850.

Class 8. 2000 feet 2-inch ash—Bidder 14, \$125; 3, \$130; 12, \$300.

Class 9. Wrought iron pipe, ells, angles, &c.—Bidder 15, \$536.30; 9, \$576.58; 1, \$642.71.

Class 10. Supports and runways—Bidder 13, \$3943; 1, \$4250.

Class 11. White oak leather belting—Bidder 10, \$806.10; 8, \$912.25; 17, \$954.30; 1, 1106.85; 11, \$1014.75; 2, \$1054.50; 16, \$1077.25; 6, \$1110; 15, \$1200.75; 5, \$1517.20; 18, \$1598.

### Pensacola, Fla.

Bidder 1, U. Baird Machinery Company, Pittsburgh; 2, Mayo & Rohrer Company, 220 Broadway, New York City; 3, John I. Brady, 612 Bourse Building, Philadelphia; 4, Chas. A. Schieren, 47 Ferry street, New York City; 5, Dan'l A. Lowber, 45 Dey street, New York City; 6, National Leather Belting Company, 7 Ferry street, New York City; 7, A. M. Avery, Pensacola; 8, Chas. F. Chaney, New London, Conn.; 9, Cuyler & Mohler, Baltimore, Md.; 10, Page Belting Company, Concord, N. H.; 11, White Hardware Company, Norfolk, Va.; 12, H. A. Rogers, 19 John street, New York City; 13, Bradford Belting Company, Cincinnati, Ohio; 14, Fayerweather & Ladew, East Houston street, New York City.

Class 1. Single and double belting—Bidder 14, \$1905.75; 13, \$2184.86; 6, \$2242.93; 9, \$2297.95; 7, \$2335.38; 3, \$2401.38; 5, \$2420.80; 1, \$2432.49; 11, \$2523.35; 12, \$2596.80; 4, \$2603.09; 10, \$2615.27; 2, \$2698.75; 8, \$2741.35.

The tide of immigration into the United States always rises and falls in sympathy with the degree of industrial prosperity prevailing in this country. Therefore statistics given out by the Immigration Bureau for the past few years furnish a good index of the fullness or otherwise of labor employment here. Thus the arrivals of foreigners in the fiscal year ended June 30 last strongly reflect the prosperous conditions existing in the past 12 months. It is shown that over 520,000 persons came into the country from abroad in the past 12 months, as compared with 311,715 for the previous year. Of these, 341,711 arrived at the port of New York alone, or 30,000 more than the total entries at all ports in the fiscal year 1899. This inward movement was higher at the end of the last fiscal year than at the beginning and is apparently still increasing. In May and June it was proceeding at the rate of nearly 600,000 arrivals a year. This current immigration compares as follows with that of recent years at its highest and lowest points, that of the last fiscal year being partly estimated: 1900, 520,000;

1890, 311,715; 1898, 229,299; 1897, 230,832; 1896, 343,267; 1895, 279,048; 1893, 502,917; 1892, 623,084; 1886, 334,203; 1882, 788,992; 1878, 138,469.

## Canadian Notes.

### Power Works on Chaudiere River.

TORONTO, Aug. 17, 1900.—Since last October the Engineering Contract Company have been at work constructing a dam on the Chaudiere River, back of Quebec city, for the Canadian Electric Light Company, a corporation made up chiefly of wealthy citizens of Quebec. There are now 420 men engaged on the dam. This structure is to be 800 feet in length. On the west side a section of 200 feet is already built, and one of 100 feet on the east side. Four hundred more, it is expected, will be built before the close of the present month, leaving 100 feet to be completed in September. At the extremity of this dam another similar wall 175 feet in length terminates at right angles with a mass of rock. There is still another dam 90 feet long from which passes a pipe 8½ feet in diameter and 350 feet long. Soon two other similar pipes will be constructed to meet the expected requirements of the company, as the power is likely to be needed for a big pulp mill that is now under negotiation.

The contract for the power house was given a few days ago to Joseph Paquet of Levis, who is to begin work upon it at once. At the outset there will be two turbines of 1460 horse-power. Machinery of the very best class is to be installed.

### Amalgamation of Stove Companies.

There was a meeting of several of the stove manufacturing concerns of Ontario in Woodstock on the 14th inst. The project, proposed about 18 months ago, of fusing the Hamilton companies and one or two others into one corporation was not carried out owing to differences among the parties, and possibly to some difficulty about getting the capital required. The new scheme is on a larger scale, embracing many important companies in Western Ontario that were not formerly included. As now contemplated, the arrangement will not come into effect before next January. Among those present at the Woodstock meeting were: John H. Tilden of Gurney, Tilden & Ware, Hamilton; J. Hardy, Toronto; W. Burrow of Burrow, Stewart & Milne, Hamilton; W. H. Carrick of the Gurney Foundry Company, Toronto; M. P. Irwin of the McClary Mfg. Company, London; J. K. Moffat of the Moffat Stove Company, Weston; W. J. Copp of Copp Bros., Hamilton, and Adam Stewart of Woodstock.

It is believed that a consolidation of the several stove and furnace making companies will make it possible to get better prices than those obtainable under the conditions of open competition that hold to-day; to save money through the elimination of any bad management there may now be in the industry; to economize at the works, in the office, on the road and at the banks; and to buy material at lower prices. Ten years ago the stove men were joined together in an association, which for a while maintained prices at a profitable level, but this period was followed by one of secret cutting, and the association went to pieces. Latterly, however, the companies have been doing well, though not quite so well as in 1898 and 1899, which were banner years in the stove making business.

The Gurney Foundry Company, Toronto, though they were represented at the Woodstock meeting appear not to be contemplating fusion with other companies. So far as they are concerned, their part in the meeting was merely to come to some arrangement as to prices for the current year. It is not denied at the Gurney office, however, that the amalgamation scheme was the business of chief interest to some of the parties present.

### Grand Forks Smelter.

The smelter at Grand Forks, B. C., has started operations. At these reduction works the North Fork has been dammed, and the water backed up until a lake 8 miles long has been formed. From this reservoir comes the power that is to run the works. As soon as that basin was filled up—which took about a week, as the stream is running low at this season—the big crushing rolls at the new smelter were started, and with them the sampling department. A delay of a week longer or more was necessary to have material ready for the furnaces. One of these is to be blown in in a few days. Thus the whole of the reduction plant will be at work in a very short time. The new smelting works are expected to give a strong impulse to the working of the mines in the mineral region tributary to Grand Forks. In Southern Kootenay mining operations received a serious setback both in the silver-lead and the gold camps, owing to

the labor troubles and the shutting down of the War Eagle to carry on further development work.

### The Kingston Furnace Project.

Impatience is being expressed by the Kingston people because nothing has yet been done in the way of making a start on the works of the iron furnace. The report that Leopold Meyer had secured capital in Belgium has not been corroborated by any word from either of the Meyers on the subject. The names of the persons composing the company were to have been made known on the 10th inst., but that date passed without the announcement. The Meyers have a deposit of \$500 cash pledged and a bond for \$3000, but the city has already expended \$6000 on the site it acquired for the furnace. The Kingston people are inclined to be a little dubious after their two former disappointments in regard to smelter projects.

### Minor Notes.

The smelter of the Intercolonial Copper Company, who own mines at Dorchester, N. B., is to be completed by the first of January. It will treat 125 tons per day.

For the Ontario & Rainy River Railroad there arrived at Fort William last week 2200 tons of steel rails on the "Algonquin," 1100 tons on the "Arabian" and 1500 tons on the "Carlo." For the past few weeks the rails have come in so fast for this road and for renewal track on the Canadian Pacific Railroad that the rails have accumulated at that port so as more or less to retard business there.

The Canadian Baling Company, Limited, have made application to the Ottawa Government for a charter with a capital of \$1,000,000 to authorize them to manufacture baling machinery. Montreal is to be the chief place of business of the company, and the provisional directors are F. R. Hart, J. A. Parker, both of Boston; J. Scott, J. D. Wood, and R. D. McGibbon, Q. C., Montreal.

F. H. Clergue is said to be negotiating for the purchase of salt works at Goderich. Salt is required as material in the chemical works which are to form one of the industries at the Sault.

C. A. C. J.

### A Metal Roofing Combination.

The incorporators of the new National Roofing & Corrugating Company, recently chartered at Wheeling, West Va., with an authorized capital of \$5,000,000, met on Tuesday, August 14, at the McClure House, in Wheeling, to complete the organization. The following officers were elected: President, C. E. Needham, Cleveland, Ohio; vice-president, Edward Langenbach, Canton, Ohio; second vice-president and general manager, Frank G. Caldwell of Wheeling; treasurer, R. J. Hyndman, Cincinnati; secretary, W. V. Wilson, Bridgeport, Ohio.

The concern have been formed to consolidate certain of the firms manufacturing iron and steel roofing, cornices, ceilings, &c., and it is stated that the following are included in the deal: The Garry Iron & Steel Roofing Company of Cleveland, Ohio; the Berger Mfg. Company of Canton, Ohio; the Hyndman Roofing Company of Cincinnati, Ohio; the Cambridge Roofing Company of Cambridge, Ohio, and the West Virginia Steel Company of Wheeling, West Va. It is understood that the new organization will be in control and ready to do business by September 1.

A new factory for the manufacture of matches is now being constructed at Harrison, N. J., the buildings being nearly completed. The company will be in the market for power plant, belting and shafting at an early day. Maurice Maas, 44 Broadway, New York, will be glad to receive catalogues and prices from manufacturers of same. The match machinery, which is of foreign make, has already been ordered and will arrive on this side shortly.

Commenting upon a contributed article on the "Fastest Trains in the World," the London *Times* says editorially: "If there is one point more than another in which English railways have claimed superiority it is in the speed of their fastest trains. Yet the United States and France are now running not one or two but many faster trains than can be found on our railroads." The editorial then goes into detail, dealing especially with the Empire State Express, and concludes with the inference that "America, at any rate, has learned to make better locomotives than England."

All cargo records on the great lakes have been broken by the new steamer "William Edenborn" of the American Steel & Wire Company, which last week loaded at Duluth 8424 net tons of iron ore. The cargo is claimed to be 200 tons heavier than any previously carried on the lakes. It is equivalent to 278,000 bushels of wheat. The "Edenborn" is 498 feet long, 52 feet beam and 30 feet deep, and was built at a cost of \$360,000.

# The Iron Age

New York, Thursday, August 23, 1900.

DAVID WILLIAMS COMPANY,	PUBLISHER.
CHARLES KIRCHHOFF,	EDITOR.
GEO. W. COPE,	ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS,	HARDWARE EDITOR.
JOHN S. KING,	BUSINESS MANAGER.

## Our Gold Medal.

The enterprise of the publishers of *The Iron Age* has been recognized by the juries of the Paris Exposition by the award of a gold medal, this being the third award received by *The Iron Age* in three consecutive international exhibitions held in the capital of France. We know that the juries who examined the Paris Library of *The Iron Age* seeks to advance and promote. Not a day and importance of the enterprise of collecting the commercial literature of upward of 5000 American manufacturers of iron, hardware and machinery, the European producers having only in recent years begun to appreciate the importance of adequately describing and illustrating their goods and equipping such literature with taste and elegance. We have had ample evidence that our costly undertaking has borne fruit, and is still doing much good in behalf of the industries whose interests *The Iron Age* seeks to advance and promote. Not a day passes but what foreigners, often from far countries, search for the names of manufacturers and study the commercial literature of the makers. It is surprising how wide a range these inquiries cover, and to what length the desire for special information goes. A number of instances have come to our notice, too, that American manufacturers themselves have found *The Iron Age* Library a useful aid under perplexing circumstances. Repeatedly the heads of important concerns have brought prospective customers to our exhibit, because it was the only place in Europe where they could show their own catalogues, not having carried their trade literature with them.

While we have known, from observation, that success was crowning our efforts in behalf of our manufacturers, we are ready to admit that it is gratifying to have a recognition of our success in the form of the award of a gold medal, coming as it does from juries on which every great industrial nation was represented by experts of international renown.

## The Capital of Industrials.

One of the stock arguments of those who rave against "trusts" is that they are outrageously overcapitalized, leaving it to be inferred that the long suffering consumer is sure to be forced to pay them profits large enough to provide ample dividends for "water." It is a favorite trick to compile elaborate tables with endless figures and staggering totals in order to arouse antagonism against the dangerous consolidations. Many conservative business men, too, have looked askance at the large capital of these new organizations, on the very different ground, however, that they represent an overvaluation of the properties. They argue that therefore those who invest in such securities must, in the long run, lose money, because their earning capacity in average years did not justify dividends on their inflated capital. They see danger to the existence of a corporation whose directors must make the effort to pay returns on very large stock issues, and can hope to do this only by raising prices.

There is something childish in the alarm over a mere array of big figures for nominal capital. There are thousands of prospect holes in the country, each represented by one or many millions of stock in pretty certificates. Yet no one takes them seriously.

So far as the common stocks in our industrial consolidations are concerned they represent, confessedly in most cases, good will and other intangible assets. They have a value determined entirely by the chance that earning capacity may at times or regularly warrant the distribution of surplus profits above the sums needed to pay dividends on usually large issues of preferred stocks. How slim this chance is in the case of some of the consolidations is thoroughly indicated by the quotations at which both their common and their preferred stocks are selling; in fact, in isolated cases it looks as though confidence in the ability to meet preferred stock charges is pretty thoroughly shaken. Those who so loudly condemn the greed and so grossly exaggerate the power of the "trusts," have a splendid opportunity now to reap a handsome reward by acting upon their convictions by investing. The preferred stocks of the greater number of the industrials net anywhere from 8 to 10 per cent. on present prices.

To-day the stocks of very few of the consolidations are selling above the original issue prices, in spite of the fact that the majority, notably in the iron industry, have greatly strengthened their position, financially and as going manufacturing concerns. Many of them have records for extraordinary earnings which, however, very few have any hope of duplicating until the next boom period comes to us.

The past year has demonstrated, by the experience with good and bad industrials, that the nominal capital has very little to do with real value; that resources, plant, equipment, working capital and management must determine it. Still we expect the agitator to continue to roll the sweet morsel of many millions under his tongue, and to denounce the "trusts" for extortionate profits which unfortunately their shareholders do not receive.

## Gold Exports and the Money Market.

The money market and the general state of trade have not been disturbed by the export of almost \$18,000,000 of gold in a fortnight for several reasons, the most obvious of which is that business on the Stock Exchange has been extremely dull for some weeks. Banks are carrying large sums of money for which they cannot find employment, and the withdrawal of this gold is little felt. At present there is little demand for money in this country, and the receipts in New York from out of town banks have been heavy. Later in the season there will be a demand from the West and South for currency, but the new financial law has added largely to the supply of bank notes, and there is entire confidence that the Secretary will deposit funds in national bank depositories, to purchase bonds, to whatever extent may seem necessary. Last year the effort of the Secretary did not avert a stringency that culminated in a panic in December. But since then additional bank circulation has been created and there is less speculation now than last year. It is the opinion of some financiers, however, that after the election there will be such a general upward movement of business that the currency will be in inadequate supply and suffering will result. But the new bank circulation and the resources at the command of the Secretary will together go far to avert any such injurious result from what in itself will be a most beneficial assurance of the security of the currency.

The indifference with which this export of gold is viewed is due rather to the law of last March and the confidence that it will continue to be executed in spirit as well as in letter than to the immediate supply of currency. The gold is going abroad, not to pay any debt, or because of fear of silver payments, but as a loan, and therefore it is recallable practically at will; it is just now most needed abroad; if it shall be most needed here it will come back. There is perfect confidence that the gold standard will be maintained, and hence the outward movement of gold has none of that sinister significance it had four or five years ago.

The standard not being endangered, apprehension can relate only to the supply of the circulating medium. This has been increased by the new bank currency, which is expected to increase still further, and may increase very greatly if conditions favor it.

It is quite probable that the new currency law has facilitated the export of gold. This is not necessarily an evil, and in certain respects it is a distinct advantage, so long as the security of the standard is not endangered. In 1890 there was a great demand from Europe for gold which was more easily supplied from this country than from any other source, because the Treasury was bound to redeem legal tender notes on demand. The Sherman law, adding to the silver and paper elements of the currency, did not drive gold out, but as silver and paper were being added to the currency on the one side, gold could be abstracted from the other without inconvenience to business, until the country rather suddenly observed that the ability of the Treasury to maintain gold payments was impaired and then there was a disastrous sense of alarm. Probably the addition of paper to the currency under the law of March 14 makes it possible to export a large sum of gold without creating a stringency, and so long as the gold is really needed in Europe this should not be deplored in this country, for the ability of the Treasury to maintain the gold redemption of legal tender notes, and the obligation upon the Secretary to use the authority conferred upon him for this purpose, are now beyond question, so long, at least, as the Treasury is controlled by the friends of the gold standard.

#### Coal Economy.

A. J. Balfour, First Lord of the Treasury, and one of the most scholarly gentlemen of the English Cabinet, in an address lately delivered before the members of the University Extension Association of Cambridge, took a pessimistic view of the progress of the arts and sciences which has characterized the century now drawing to a close. In his judgment the brilliant superstructure of invention and discovery is little better than a card house, after all, since it rests upon a consumption of fuel so recklessly wasteful in proportion to the results accomplished that the more rapid our progress along present lines the nearer we come to the inevitable collapse of our productive and distributive industries, because the coal to run them cannot be had. "Let a second Watt arise," said he; "let him bring into general use some mode of extracting energy from fuel which shall waste only 80 per cent. of it, and lo! your coal fields as sources of power are doubled at once. The hope seems to be a modest one, but it is not yet fulfilled, and therefore it is that we must qualify the satisfaction with which, at the end of the century, we contemplate the unbroken course of its industrial triumphs. We have, in truth, been little better than brilliant spendthrifts."

If Mr. Balfour had taken the trouble to advise himself more sincerely on the subject of his address, his

contribution to its literature would have been more interesting and more valuable. Assuming that he reflects the current opinion among well informed Englishmen on the subject under discussion, it is not surprising that the threatened shortage and increased cost of coal is producing something like a panic among those who fancy that nothing less than a mechanical miracle can save British industries. That the steam engine, even when refined to the limit of practicability, is in a high degree wasteful, is well known. With steam engines of the usual type run under usual conditions, it is difficult to utilize 10 per cent. of the energy liberated by the combustion of coal. With very large engines of the most improved pattern, the utilization of 12 per cent. is possible, but 9 per cent. would better represent the average in what is considered good pressure. From this poor showing of net results we must deduct the power consumed in the friction of gearing, shafting, belting and machinery. That between the coal pile and the belt pulley or its equivalent even 90 per cent. of potential energy is lost is a startling fact, especially at a time when the end of the available coal supply, if not in sight, is definitely calculable, and when every year's recovery of coal makes the miner's work of the succeeding year more difficult and dangerous, and consequently more costly.

It should be remembered, however, that the economy which Mr. Balfour considered so desirable is entirely possible with our present knowledge, and that the means of doubling the coal supply by reducing the waste from 90 to 80 per cent. are at hand. Their general adoption in anticipation of the necessity for the economy they offer is scarcely to be expected. Coal is still abundant enough and cheap enough to permit its wasteful use by present methods, and while this condition lasts the steam engine will hold its place, though every revolution robs the future by wasting nine heat units for every one utilized. When such extravagance is no longer possible the gas engine will have reached a point of development which cannot be attained with the steam engine. The Oldham tests, which are accepted as standard, show that of the theoretical heat units in the pound of coal fully 20 per cent. can be utilized in efficient energy. This means that when it becomes necessary to economize coal, we can make 1 ton do the work for which we now require 2 tons. The loss in gasifying in coal is about 10 per cent. Of the heat units given off by the gas in explosive combustion, 22½ per cent. are accounted for in indicated horse-power, 27½ per cent. are carried off with the exhaust and 50 per cent. are taken up by the water employed in cooling the cylinder. The theoretical temperature of the exploding gas in various admixtures into air is from 3245 to 6000 degrees F., the temperatures calculated from pressure gauge readings range from 1480 to 2900 degrees F. Obviously no known substance available for use in cylinders, pistons and piston rings would stand such temperatures. Cooling by means of a circulating liquid is consequently a necessity; and this necessity suggests the thought that the heat withdrawn from the cylinder to keep it cool enough to be operated may be employed to connect with an elastic vapor, water or some liquid which vaporizes at a lower temperature. So far as we are aware this has never been attempted, but it is entirely possible and may offer the means of saving another 10 per cent., which would be a vast progress over anything we have reason to believe is practicable with the steam engine. It would mean doing with 1 ton of coal the work for which we now require 3 tons. The new Watt whose advent will make possible the doubling of the available coal supply need not be waited for. Fifty, perhaps a hundred, un-

known mechanics have contributed—some more and some less—to a result which, if still incomplete, makes the life of the steam engine purely a matter of public commerce. Before their work is needed to shore up the tottering industries of Great Britain, another 50 or 100 will have refined and simplified the gas engine in every detail, and adapted it to every industrial use. The substitution will be gradual, no doubt, but as rapid as the statistical position of coal demands.

The success which has attended the distribution of high tension electrical currents for long distances, and the efficiency of electro motors, promises to lead to the grouping of inventors around central stations, in which the combination of the gas engine and the dynamo will supply power at much less cost per unit than it can now be generated in small isolated steam plants. In a word, to cut the industrial consumption of coal in two is something which can be done whenever the necessity for doing so exists. Probably it will not be recognized as existing until "the empty coal cellar" is something more than a statistical forecast of the remote future. Meanwhile the question is forcing itself on the consideration of economists whether coal in the earth is in any proper sense private property, and whether the public interest does not demand that its mining and distribution be regulated. In Great Britain there is a growing sentiment in favor of an export duty on coal which shall conserve the limited domestic supply for home use. What it will lead to we do not know, but that it exists is significant.

#### The Chicago Building Trade War.

The labor troubles in the Chicago building trade have been quite frequently reported to be on the verge of a settlement. In fact, so positive have been some of the statements thus made that the impression generally prevails outside of Chicago that the lockout has either been ended or is now quite insignificant in its extent and character. Unfortunately this is not the case. While some secessions of quite important firms from the ranks of the contractors and withdrawals of certain unions from their federation have occurred, the contest is still in progress. Each of these breaks, as it took place, has been considered an evidence of the disintegration of the opposing forces, and has, therefore, given rise to the belief that the end of the controversy was at hand. But despite the yielding of some of the wearied parties, the main fighting line has been preserved and the leading combatants still regard each other with stubborn determination. We are again this week treated to reports of decided wavering on the part of the workingmen, but it remains to be seen whether or not these developments really mean the early termination of the difficulty.

This is one of the longest labor conflicts of any magnitude that this country has known. It began practically with the opening of the year. Its great duration is, therefore, a sad commentary on our supposed progress toward the adoption of rational methods of settling labor disputes. Reflecting upon the conditions which have thus prevailed in Chicago for so long a time, it is amazing that a settlement of some kind has not been accomplished. A very large part of the business of the second city in the United States has been in a condition of paralysis for eight months, awaiting a test of endurance between two sets of men. They are not the only ones interested, because the entire community is more or less affected by the great shrinkage in building operations, while manufacturers or producers of materials in quite distant localities have also suffered from the curtailment of their usual Chicago demand. Millions of dollars have

been lost which cannot be made up, as the possible returns from this year's activity are irretrievably gone.

If the contest had been solely over rates of wages or hours of labor it is not probable that it could have continued so long, because in the nature of things a compromise would have been made after a reasonable test of strength. But this controversy is unique. The contractors are contending for freedom from the tyranny of walking delegates and for the abolition of restrictions on the amount of work a man may do in an eight-hour day. The fight over these questions had been brewing for a long time and it seemed inevitable. Coming this year it has prevented Chicago from reaping any large measure of the benefits of the prosperous times which the country in general has enjoyed.

That this serious situation may speedily be ended is most earnestly desired. Winter is rapidly approaching, when but a limited amount of outdoor work can be done. On the one hand are the contractors and material men, who are suffering losses in their inability to conduct business, possibly facing bankruptcy in having obligations to meet, while on the other hand are thousands of workingmen and their families, whose income ceased when the head of the household was thrown out of employment early in the year. The city authorities and local charitable institutions will have a very serious problem on their hands this winter if the dispute is not soon settled.

#### OBITUARY.

##### ALVIN F. JENKS.

Alvin Fales Jenks, who for many years was president of the Fales & Jenks Machine Company of Pawtucket, R. I., died on August 5 at Atlantic City, N. J., aged 71 years, after several years of failing health. He was born at the village of Central Falls, R. I., and went to work at an early age in the machine shop of Fales & Jenks, which at that time was located at Central Falls, and which was conducted by his grandfather, Stephen Jenks. This concern ultimately developed into the business now known as the Fales & Jenks Machine Company. After several years in the shop and gaining a practical training as a machinist he was taken into partnership, the firm name being changed to Fales & Jenks' Sons. When the firm was reorganized and incorporated as the Fales & Jenks Machine Company Mr. Jenks was elected president, which position he held until he was obliged to relinquish it on account of failing health.

##### J. M. GARR.

J. M. Garr, president of the firm of Garr, Scott & Co., manufacturers of threshing machines of Richmond, Ind., died in that city last week.

##### EDWARD S. SMITH.

Edward Spencer Smith, a prominent business man of Waterbury, Conn., died at his home there August 18. Mr. Smith was born in Waterbury in 1852. Early in life he was connected with the Manhattan Brass Mfg. Company of New York. In 1871 he became secretary and manager of the Smith & Griggs Mfg. Company of Waterbury, makers of brass goods, in which concern he was interested up to the time of his death.

##### AUGUST POLLAK.

Few men in the Western iron trade were better known or more highly respected than August Pollak, who died suddenly in a hospital at Chicago from peritonitis, on the 15th inst. Mr. Pollak was 44 years old. He was born May 7, 1856, in Vienna, Austria, but was brought to this country by his parents when but 9 years of age. He was educated in Cincinnati, and his introduction to the iron business began in that city under the tutelage of his brother Emil, president of the Block-Pollak Iron Company, then Block & Pollak. He was first a bookkeeper, afterward traveled for the firm, and in 1884, when they opened an office in Chicago, he removed to that city as a resident partner, the firm name being changed to Block, Pollak & Co. In 1885 he withdrew from the firm, and, after traveling in Europe for a year, engaged in business on his own account in Chicago as a dealer in old iron and steel. His native ability and his thorough knowledge of the peculiarities of this line of commercial activity soon secured for him an im-

portant share of the trade of the largest consumers, which his sterling integrity and reliability retained during his entire career. He was a man of many sides, having marked literary ability, besides being an accomplished linguist and musician. He leaves a widow and three children.

## Paris Exposition Awards.

Cable reports to the daily press give a list of the awards to American exhibitors at the Paris Exposition. In all the United States secured 1981 awards, of which 220 were grand prizes, 486 gold medals, 583 silver medals, 270 honorable mentions. The dispatches name only those who received grand prizes or gold medals, and in some departments the exact award is not specified. We reprint below the names of the successful exhibitors:

### Department of Machinery—Group IV.

#### GRAND PRIZES.

Worthington Pumping Engine Company, Brooklyn, N. Y.  
Batcheller Pneumatic Tube Company, New York.  
Brown & Sharpe Mfg. Company, Providence, R. I.  
Pratt & Whitney Company, Hartford, Conn.  
E. W. Bliss Company, Brooklyn, N. Y.  
Niles Tool Works Company, Hannibal, Ohio.  
J. A. Fay & Egan Company, Cincinnati, Ohio.

#### GOLD MEDALS.

Ball Engine Company.  
William Sellers Company, Philadelphia.  
George F. Blake Mfg. Company,  
Tinliss Olsen & Co., Philadelphia.  
Otis Elevator Company, New York.  
Rand Drill Company, New York.  
Charles A. Schieren & Co., New York.  
Crane Company, Chicago.  
Ingersoll-Sergeant Drill Company, Easton, Pa.  
Shaw Electric Crane Company, Milwaukee, Wis.  
Simonds Mfg. Company, Fitchburg, Mass.  
Chicago Pneumatic Tool Company, Chicago, Ill.  
Morse Twist Drill & Machine Company, New Bedford, Mass.  
Cincinnati Milling Machine Company, Cincinnati, Ohio.  
Hendey Machine Company, Torrington, Conn.  
Warner & Swasey, Cleveland, Ohio.  
Norton Emery Wheel Company, Worcester, Mass.  
Bement-Miles Company, Philadelphia.  
E. C. Atkins & Co., Indianapolis, Ind.  
Gisholt Machine Company, Madison, Wis.  
Jones & Lamson Machine Company, Springfield, Vt.  
F. E. Reed Company, Worcester, Mass.  
Deering Harvester Company.  
Bullard Machine Tool Company, Bridgeport, Conn.  
Pond Machine Tool Company, Plainfield, N. J.

### Department of Machinery—Group V.

#### GRAND PRIZES.

American Steel & Wire Company, New York.  
E. C. Acheson, Niagara Falls, N. Y.  
Rowland Telegraphic Company.  
Western Electric Company.  
John A. Roebling's Sons Company, Trenton, N. J.

#### GOLD MEDALS.

Bullock Electric Mfg. Company, Cincinnati, Ohio.  
Lorain Steel Company, Lorain, Ohio.  
Western Electric Company.  
Alvin Mfg. Company.  
National Carbon Company.  
C. J. Toering Company.  
Ward, Leonard & Co.  
Helios-Upton Company.  
Holophane Glass Company.  
Hart & Hegenau Mfg. Company.  
Edison Phonograph Company.  
Western Electrical Instrument Company.  
Mica Insulator Company.

In the following groups the awards are not separated as to character, nor is the list we publish complete:

### Department of Civil Engineering and Transportation.

George A. Fuller Company, New York.  
Phoenix Bridge Company, Phoenixville, Pa.  
American Society of Civil Engineers, New York.  
Columbia Factory, American Bicycle Company.  
Baldwin Locomotive Works, Philadelphia.  
Pressed Steel Car Company, Pittsburgh.  
J. G. Brill Company, Philadelphia.  
Westinghouse Air Brake Company, Pittsburgh.  
Louis A. Haupt.  
George A. Fuller Company, New York.  
Engineering News Publishing Company, New York.  
Baldwin Company.  
Deering Harvester Company.

Cleveland Factory, American Bicycle Company.  
Monarch Factory, American Bicycle Company.  
Crescent Factory, American Bicycle Company.  
Chain Factory, American Bicycle Company.  
American Steel & Wire Company, New York.  
American Electric Vehicle Company.

Columbus Buggy Company.  
American Railway Master Mechanics' Association.  
American Railway Association.  
The Master Car Builders' Association.  
Gould Coupler Company.  
International Pneumatic Signal Company.  
McConway & Torley Company, Pittsburgh.

### Department of Agriculture.

McCormick Harvesting Machine Company.  
Deering Harvester Company.  
D. M. Osborne & Co.  
Adlance, Platt & Co.  
Johnston Harvester Company.  
Milwaukee Harvester Company.  
Walter A. Wood Reaping & Mowing Machine Company.  
Plano Mfg. Company.  
Indo-Egyptian Compress Company.  
Oliver Chilled Plow Works.  
The Aeromotor Company.  
Aultman, Miller & Co.  
Syracuse Chilled Plow Company.  
Deere & Co.  
Warder, Bushnell & Glessner Company.  
Whitman Agricultural Company.  
Stover Mfg. Company.  
Oliver Chilled Plow Works.  
S. L. Allen & Co.  
P. M. Sharples & Co.

The following is the full list of the department of mining and metallurgy, a special cable to *The Iron Age* specifying those who received grand prizes.

### Mining and Metallurgy.

#### GRAND PRIZES.

American Steel & Wire Company of New Jersey, New York City.  
American Tin Plate Company, New York.  
California State Commission to the Paris Exposition, San Francisco, Cal.  
Colorado Fuel & Iron Company of Pueblo, Col.  
Copper Queen Consolidated Mining Company of New York City.  
United States Geological Survey, Washington, D. C.  
Ingersoll-Sergeant Drill Company of New York City.  
Oil Well Supply Company of New York City.  
American Museum of Natural History, New York City.  
Lehigh Valley Coal Company of Wilkes-Barre, Pa.  
Standard Oil Company, New York.  
Robins Conveying Belt Company, New York.  
Department of Mining and Metallurgy, United States Commission to the Paris Exposition, F. J. V. Skiff, director.

#### GOLD MEDALS.

American Institute of Mining Engineers, New York City.  
Barney Marble Company of Vermont, Swanton, Vt.  
Bullock, M. C., Mfg. Company of Chicago.  
California State Mining Bureau, San Francisco, Cal.  
Brake & Co., St. Paul, Minn.  
Jeffrey Mfg. Company, Columbus, Ohio.  
George F. Kunz, New York.  
New Almaden Quicksilver Mining Company of California, New Almaden, Cal.  
New York State Museum of Albany.  
North Carolina State Board of Agriculture, Raleigh, N. C.  
North Carolina State Commission to the Paris Exposition, Raleigh, N. C.  
Pike Mfg. Company, Pike Station, N. H.  
Rand Drill Company of New York City.  
Robins Conveying Belt Company, Park Row Building, New York City.  
Charles Kirchhoff, editor *The Iron Age*, New York City.  
Richard P. Rothwell of New York.  
Frank Saward, editor *Coal Trade Journal*, New York City.  
M. H. Fuller of the Massachusetts Institute of Technology, Boston.  
American Steel & Wire Company, New York City.  
American Tin Plate Company of New York City.  
Colorado Fuel & Iron Company, Pueblo, Col.  
Crescent Steel Company, Pittsburgh, Pa.  
Copper Queen Mining Company, New York and Bisbee, Ariz.  
John A. Roebling's Sons Company, Trenton, N. J.  
Department of Mining and Metallurgy, United States Commission to the Paris Exposition, F. J. V. Skiff, director.  
*The Iron Age* of New York City.

Wellman-Seaver Engineering Company, Cleveland, Ohio.  
 Colorado Smelting & Mining Company, Denver, Col.  
 John A. Roebling's Sons Company, Trenton, N. J.  
 American Steel & Wire Company of New York.  
 Fayette R. Plumb, Frankford, Philadelphia, Pa.  
 The Hibbard-Rodman-Ely Company, New York.  
 The Eagle Lock Company, Terryville, Conn.  
 Yale & Towne Mfg. Company, New York City.  
 American Iron & Steel Mfg. Company, Reading, Pa.  
 Copper Queen Consolidated Mining Company of New York.  
 Winslow Brothers Company of Chicago.  
 Simonds Mfg. Company, Fitchburg, Mass.  
 J. H. Williams & Co. of Brooklyn.  
 E. C. Atkins & Co., Indianapolis.  
 Bommer Brothers, Brooklyn, N. Y.  
 The Stanley Works, New Britain, Conn.  
 J. A. Kebler, Colorado Fuel & Iron Company, Pueblo, Col.  
 O. T. Waring, Standard Oil Company, New York.  
 Dr. David T. Day, Washington.  
 W. S. Ward, Denver, Col.  
 A. E. Valois.  
 J. H. Drake, Chicago.

Among those classified under varied industries the following have received grand prizes or gold medals:

**Department of Varied Industries—Groups 12 and 15.**

Winslow Brothers, Chicago.  
 American Radiator Company, Chicago.  
 National Cash Register Company, Dayton, Ohio.  
 A. G. Spalding & Bros., Chicago.  
 Standard Mfg. Company, Pittsburgh.  
 Stewart Hartshorn Company, Newark, N. J.  
 Model Heating Company, Philadelphia.  
 Michigan Stove Company, Detroit, Mich.  
 Warren Webster & Co., Camden, N. J.  
 George M. Clark & Co., Chicago.  
 International Heater Company, New York.  
 Magee Furnace Company, Boston, Mass.  
 J. L. Mott, New York.  
 Arthur Kitson, Philadelphia, Pa.  
 Crane Brothers, Westfield, Mass.  
 Brown & Sharpe, Providence, R. I.  
 American Shearer Mfg. Company, Nashua, N. H.  
 Automatic Electric Clock Company, Chicago.  
 Henry Bonnard Bronze Company, New York.  
 Winslow Brothers, Chicago.  
 Bissell Carpet Sweeper Company, Grand Rapids, Mich.  
 American Wringer Company, New York.

---

## The Armor Plate Problem.

---

### A Protest from Midvale.

---

WASHINGTON, D. C., August 21, 1900.—The armor plate problem, which became additionally complicated last week as the result of the summary rejection of all the bids for the 36,000 tons authorized by Congress to be contracted for, developed a new and important phase this week which may result in far reaching consequences. The Midvale Steel Company, who were the lowest bidder on the entire quantity of improved, face hardened armor, constituting about 31,000 tons, are dissatisfied with the action of Acting Secretary Hackett in rejecting all the bids, and a formal appeal, supported by a carefully prepared brief, has been received by Secretary Long, who is spending his vacation in Massachusetts. Admiral O'Neil, chief of the Bureau of Ordnance, is also absent on leave, but is spending his vacation near the summer home of Secretary Long, so that conferences between the two officials may take place whenever necessary. While the utmost reticence is observed both by departmental officials and by representatives of the Midvale Steel Company here, enough is known to indicate the outlines of the protest that has been filed.

It is contended that the Midvale Steel Company are the lowest bidder on the entire amount of Class A armor and should therefore receive the contract for at least as much of that armor as they can deliver within the requirements of the department. As it is estimated that only 7200 tons of improved, face hardened armor for the three battle ships of the "Maine" class will be required within the next two years, it is therefore urged that the Midvale Steel Company will be in position to deliver the balance of the 31,000 tons as fast as the Government will require it. This will leave about 24,000 tons of Class A armor which might be allotted to the Midvale Steel Company and for which that company bid approximately \$440 per ton, without additional charge for royalty. The bids of the Bethlehem and Carnegie companies, which were made on a basis of 15,000 tons only

of Class A armor, were at the rate of \$490 per ton, including royalty. As the Government reserved the right to reject any or all bids, it is contended on behalf of the Midvale Steel Company that the department could have accepted their bid for the 24,000 tons which will not be required under two years, and then could have readvertised for the 7200 tons required for the "Maine" and class. There could be no competition on the part of any firm other than the Bethlehem and Carnegie companies to furnish the armor for the "Maine" and class, as only existing plants could produce it within the required time.

It is understood that the appeal anticipates the objection of the department that the armor plate manufacturers having plants might decline to bid on so small a quantity as 7200 tons, or, if they consented to submit proposals, would make the price prohibitory. It is not thought they would object to bidding on this amount and it is contended that the Government should not permit the fear that it might be obliged to pay a high price for the 7200 tons to induce it to pay a high price on the entire 36,000 tons.

The action of the Midvale Steel Company in protesting against the rejection of the bids has aroused the liveliest interest in the department. Some doubt is expressed by experienced officials as to the legality as well as the propriety of the rejection of the bids by Assistant Secretary Hackett. In this connection it is pointed out that the law, as passed by Congress, authorizing contracts for armor plate to be made expressly stipulated that the price should be "satisfactory to the Secretary of the Navy." While it is conceded that for all practical purposes the Acting Secretary of the Navy is clothed with full powers, yet in the case of an unusual statute like the one in question it is doubtful whether a subordinate official, acting as Secretary while that officer was merely absent and not incapacitated, possessed the necessary authority to reject the bids. So far as the propriety of the transaction is concerned, there are many who take the view that the rejection of the bids on the day following their opening, while the Secretary was absent, but in daily communication with the department, was both hasty and arbitrary.

In presenting their appeal to the Secretary of the Navy it is understood that the Midvale Steel Company transmitted it directly to that official and not through department channels. The fact that the amended circular making a new allotment of armor as the basis of the proposals to be submitted under the new advertisement on October 2 has been withheld is thought in some quarters to be significant of the possible reconsideration by the Secretary of the action of Assistant Secretary Hackett, but it is stated at the department that the delay is owing to certain changes that have been made in the text of the document, which has twice been forwarded by mail to Admiral O'Neil for his approval. In spite of the corrections thus far made in this circular, it is believed that when finally completed it will still provide four classifications for proposals; first, for about 7200 tons of armor for the three battle ships of the "Maine" class; second, for the remainder of the 36,000 tons required for the 14 other vessels; and third, for the entire 36,000 tons required for all purposes; and fourth, for any quantity of armor up to 36,000 tons which the bidder desires to make.

There is naturally much speculation as to the probable action of the Carnegie and Bethlehem companies in the event that the department sees fit either to accept the Midvale Company's bid for about 24,000 tons of Class A armor, or upon readvertisement to allot to the Midvale Company any considerable proportion of the total amount of armor required. In the original bids both the Carnegie and Bethlehem companies stipulated that their proposals could only be considered for allotments of approximately one-half each of the total amount of armor required. While this stipulation would operate to secure to one of the two companies a large order, it would not prevent the department from awarding about one-half the entire amount to the Midvale Steel Company. If the Midvale Steel Company had not insisted upon an award of 20,000 tons and had been satisfied to take about 18,000 tons, the department could have allotted that amount at a saving of at least \$35 per ton, afterward awarding the balance of about 18,000 tons to either the Carnegie or the Bethlehem Company. Under this arrangement, however, there would have been some delay in procuring the armor for the "Maine" and class, as neither of the two companies promised deliveries under six months, and then at the rate of but 300 tons per month. The department would probably have been willing, however, to go to some trouble and expense to effect such an arrangement, though it would have preferred to allot the armor about equally between the three bidders. No intimation has been received here as to the probable course of any of the companies in the event that Secretary Long approves the rejection of the bids, and the outcome is awaited with the keenest interest. W. L. C.

## MANUFACTURING.

### Iron and Steel.

The Reading Iron Company of Reading, Pa., have practically decided to build an open hearth steel plant. As yet, however, no particulars as to designs, &c., have been definitely decided upon.

Among the orders recently booked by the Bethlehem Steel Company are spare propeller shafts for the steamers "Ponce" and "San Juan" of the New York & Porto Rico Line, which are being furnished to Harlan & Hollingsworth Company of Wilmington, Del. They are also supplying eight forged hollow shafts of fluid compressed open hearth steel for use in Cuban sugar mills, and, in addition to these, are making a large number of gun barrels for the Winchester Repeating Arms Company and Colt's Patent Fire Arms Company. These latter forgings are to be made of Bethlehem nickel-steel, which is peculiarly adapted to the purpose on account of its ability to withstand severe strains.

The Crum Lynne Iron & Steel Company, whose plant at Crum Lynne, Pa., has been shut down for several months, will shortly begin operations again. Two 60-inch shear mills are being installed in place of the grooved mills heretofore used. Sheared boiler tube skelp will be the principal product of the plant.

The Empire Rolling Mill Company of Cleveland are incorporated under the laws of Ohio. The officers are C. G. Parkwill, president; W. J. Morgan, vice-president; D. R. James, secretary and treasurer; J. D. Paton, superintendent. Mr. Paton was formerly superintendent of the Crescent Sheet & Tin Plate Company, and Mr. James was for many years connected with the Union Rolling Mill Company. The location of the new plant is on Bessemer avenue, at the crossing of the Erie & Pennsylvania Railroad. The main building is 100 x 200 feet, with wings 50 x 75 and 50 x 100 feet, all of steel and iron construction. The mill contains one three-high 20-inch muck train and a 10-inch finishing train, with 12-inch Belgian roughing, built by Totten & Hogg Iron & Steel Foundry Company of Pittsburgh. The muck mill will be driven direct by a 28 x 48 inch engine and the 10-inch Belgian train by a 26 x 48 inch engine, the roughing by gears and the train by belt. These engines are of the latest improved heavy duty Corliss type, built by Lane & Brodby of Cincinnati. The steam will be furnished by four 150 horse-power Cook water tube boilers, which will utilize the waste heat from eight busheling furnaces, and two 125 horse-power tubular boilers, direct fired. There are two gas heating furnaces, with working chambers 7½ x 15 feet. The product will be iron and steel bars, and the mill will be ready for operation in about six weeks.

The Ohio Rolling Mill Company, Findlay, Ohio, have signed the Amalgamated Association scale and started up their puddling and bar mills.

At the Ohio Works of the National Steel Company, Youngstown, Ohio, eight additional soaking pit furnaces are being built, which will give a total of 24. This plant will have a capacity for turning out fully 2000 tons or more of finished steel every 24 hours.

The Beaver Steel Works, at Beaver Falls, Pa., taken over by the Crucible Steel Company of America, have been closed down.

The plant of the Cumberland Steel & Tin Plate Company, at Cumberland, Md., has been transferred to the Crucible Steel Company of America of Pittsburgh for \$210,000. It is stated that the plant will be closed down for an indefinite period.

The Brier Hill Iron & Coal Company are installing at their Grace Furnace at Youngstown, Ohio, a Davies casting machine.

### Machinery.

The United Boiler Company of Girard, Ohio, have been organized as the Girard Boiler & Mfg. Company. The capital stock is \$50,000. F. H. Clipp is president, W. H. Johnson, secretary and F. W. Havalak treasurer.

The Curtis & Curtis Company of Bridgeport, Conn., manufacturers of pipe cutting and threading machinery, have just received cable from their Paris agents that their Forbes patent die stocks, of which they made an exhibit at the Paris Exposition, have been awarded the silver medal by the Board of Award.

It is reported that the Sullivan Machinery Company of Chicago, manufacturers of prospecting, mining and quarrying machinery, contemplate establishing, at an early date, a branch house in Spokane, Wash.

The Kingsford Boiler Works, Oswego, N. Y., which were burned several months ago, causing a loss of \$100,000, are to be rebuilt.

The Searchlight Acetylene Gas Machine Company, Wilkes-Barre, Pa., have been incorporated, with a capital of \$300,000, and are under the supervision of I. C. Wightman, the inventor of the machine.

The Cleveland Punch & Shear Works Company of Cleveland, Ohio, have let contracts for extensive improvements to their plant, by which their capacity will be greatly increased. This has become necessary by reason of increased business and the growing demand for heavier tools in their line. Among recent

shipments of their machines are the following: Bending and straightening machine for the Wm. R. Trigg Company, Richmond, Va.; 54-inch throat punch for the Hamler Boiler & Tank Company, Chicago; 6-foot arm radial drill for the Charleston Boiler & Foundry Company, Charleston, W. Va.; 8-foot arm radial drill for the Compagnie Internationale d'Electricité, Liège, Belgium; 36-inch throat punch for the Patterson Supply Company of Cleveland; 12-foot arm radial drill for the Carnegie Steel Company; 10-inch throat horizontal punch for the Joliet Bridge & Iron Company, Joliet, Ill.; 18-inch beam coping punch for the Easton Foundry & Machine Company, Easton, Pa.; 36-inch throat punch for the Belmont Iron Works, Philadelphia, Pa.; T horizontal punch for the Phoenix Iron Works, Meadville, Pa., and a 12-foot arm radial drill and 36-inch throat punch for the Hawley Down Draft Furnace Company, Chicago, Ill.

Charles H. Besley & Co., 10 and 12 North Canal street, Chicago, Ill., report their general business as very good. They are receiving many orders from jobbers in New York, Boston, Providence, Pittsburgh, Cleveland and Detroit for their parallel clamps, which are all steel, case hardened, on which all surfaces are either parallel or at right angles to each other. These clamps are very desirable for use on drill planers, milling machines and shapers. They are also receiving many orders for their Gardner die stocks, which cut a full thread at a single cut, and are also adjusted to cut regular and 1-32 inch over size. Recent shipments have been made of several complete shop equipments to the extreme Northwest. Several rush orders for Gardner grinders have been received from England.

The Larzelere Machine Company of Williamsport, Pa., have within a short time made an addition to their machine shop building. The new machinery consists of lathes, shapers and presses. The present is the best business year the firm have had, they having had to work overtime during most of it. Among recent shipments of engines are the following: Susquehanna Paper Company, Conowingo, Md.; C. L. Harter, Vintondale, Pa.; Crissman, Miller Lumber Company, Blackwells, Pa.; J. J. Thomas, Benton, Pa.; Robert Dunbar, Elimsport, Pa.; McKean Company, Dahoga, Pa.; W. B. Lentz, Jersey Shore, Pa.; G. W. Eighmey, Leeley Creek, N. Y.; Milton Iron Company, Milton, Pa.; Q. S. Backus and Williamsport Iron Company, both of Williamsport, Pa.

Baugher, Kurtz & Co. of York, Pa., are erecting a full equipment of powder mill machinery for the Rockdale Powder Company, Baltimore, Md., and the same for a prominent hardware company at Johnstown, Pa. The works are kept very busy, the foundry melting 30 to 35 tons of iron per day.

Jenkins & Lingle, Bellefonte, Pa., have recently made sales of their patent power hammer as follows: To the Pennsylvania Railroad Company, six hammers; Baldwin Locomotive Works, Philadelphia, four hammers; United States Government, one hammer; Draper Company, Hopedale, Mass., two hammers; Crescent Steel Company, Pittsburgh, two hammers; Swab Wagon Company, Elizabethville, Pa., one hammer; Niles Tool Works, Hamilton, Ohio, two hammers; Thomas B. Weston, Baltimore, Md., one hammer; Pennsylvania Steel Company, Harrisburg, Pa., one hammer, and to the Petit Ornamental & Fence Company, Ambler, Pa., one hammer. They have also sold a considerable number of their hammers to foreign firms. Among these was an order for four hammers from Gustav Diechmann & Sohn, Berlin, Germany.

The Marine Engine & Machine Company have been incorporated in New Jersey, with a capital stock of \$500,000. The company have the power by their charter to build ships, launches and manufacture marine engines and machinery. Their incorporators live in Newark.

The citizens of Franklin, Pa., have subscribed \$100,000 for stock in the Grant Machine Tool Company of Cleveland, Ohio. The plant will be removed from Cleveland to Franklin and enlarged.

The Smith Mfg. Company of Waynesboro, Pa., who were founded by G. W. Smith, now the president and superintendent, in 1890, were incorporated on February 5 of this year. During the whole career of the enterprise when owned by Mr. Smith, and since the foundation of the present organization, the concern have always had an abundance of work. They have just contracted for the building of new shops, which will enable them to extend their lines of manufacture. They are builders of steel plants, fire escapes, lawn settees and swings, stock troughs, tanks and a general line of builders' supplies and structural steel work. Work in hand includes structural steel columns, trusses, beams, crane ways, &c., for the new Landis Tool Company foundry building, Waynesboro, Pa., and also a similar construction for the new boiler shop of the Geiser Mfg. Company, Waynesboro.

The American Machine & Foundry Company of Hanover, Pa., who were organized last April, are now employing 150 hands, the force being added to daily. They have just made an addition of 65 x 35 to their machine shop, and are about making an addition to the foundry of 90 x 30. Up to the present they have been engaged almost exclusively in the manufacture of tobacco machinery.

## The Iron and Metal Trades.

The buying movement is spreading in a number of directions. Considerable additional business has been done in Bars, notably in the West, at better prices than the lowest. A heavy tonnage, chiefly for shipbuilding purposes, has been placed in Plates, and some makers show a disposition to demand better prices. The Sheet trade, too, is more animated and in better shape.

The sharp drop in the price of Structural Material came in the nature of a surprise, since only a week before the association had decided to maintain prices at the level established by the June reduction of \$7 per net ton. The talk of outside competition as the cause of the reduction is nonsense. The true reason is that large interests were convinced that relatively the price was too high. While it is admitted that building operations have been checked by the high price of all materials, including Steel, it is certain that the consumption of Structural Material this year has been very heavy in spite of the prices established, which, by the way, were kept relatively lower than any other line of manufactured Iron and Steel. We understand that during the first seven months of the current year the shipments were 20 per cent. greater than those of the corresponding period of 1899. The order books, however, are naturally not in anything like the shape they were last year at this time, during an excitedly rising market. So far as we can learn no marked increase in orders has followed the cut in prices.

There has been more movement in Foundry Pig Iron, and while there is still a good deal of pressure to sell, the participants in the struggle are not quite so numerous. A good deal of tonnage has been placed in Chicago, the Malleable manufacturers being leading buyers. It is understood, however, that the Cast Iron Pipe interest has picked up a good deal of Iron and that in the East some large transactions have been closed.

Reports are current that a very large sale, involving 27,000 tons, has been made for export by a Southern interest. Advices from Europe indicate that some very low offers have been made there to sell both Bessemer and Basic Open Hearth Pig Iron. One figure named is 57 shillings 6 pence, Belgian port, which is more calculated to frighten buyers than to bring business. Eastern Pennsylvania mills have sold 10,000 tons of Bars, Plates and Skelp for export.

Freight room continues to be very difficult to arrange for, and rates are stiffening. This is very seriously checking the export business. Thus it is making impossible any sales of Old Material to the Mediterranean, where some demand has again developed.

The Tin Plate scale is practically settled, so that an early resumption may be looked for. The Bar scale is in such shape that there may be a prolonged idleness at the union mills, which, however, do not control the situation.

In the metal trade the feature has been the drop in Pig Tin in London, promptly reflected here, an easing in the British Copper market, and rather a weaker feeling in other metals on this side.

## A Comparison of Prices.

At date, one week, one month and one year previous.

### Advances Over the Previous Month in Heavy Type. Declines in Italics.

Aug. 23, Aug. 15, July 26, Aug. 23,  
1900. 1900. 1899.

#### PIG IRON:

	\$16.00	\$16.25	\$16.25	\$20.75
Foundry Pig, No. 2, Standard, Philadelphia	13.75	13.75	16.00	18.50
Foundry Pig, No. 2, Southern, Cincinnati	15.50	16.00	17.50	20.50
Foundry Pig, No. 2, Local, Chicago	15.00	16.00	16.00	22.50
Bessemer Pig, Pittsburgh	13.50	14.00	15.00	19.00
Gray Forge, Pittsburgh	20.00	20.00	21.00	23.00
Lake Superior Charcoal, Chicago				

#### BILLETS, RAILS, ETC.:

Steel Billets, Pittsburgh	18.00	18.00	19.00	36.00
Steel Billets, Philadelphia	20.00	20.50	22.50	38.00
Steel Billets, Chicago	20.00	20.00		36.80
Wire Rods, Pittsburgh	35.00	35.00	30.00	44.00
Steel Rails, Heavy, Eastern Mill	35.00	35.00	35.00	32.00
Spikes, Tidewater	1.80	1.80	2.10	2.30
Splice Bars, Tidewater	1.50	1.50	2.00	2.00

#### OLD MATERIAL:

O. Steel Rails, Chicago	9.50	9.50	9.50	15.50
O. Steel Rails, Philadelphia	18.00	18.00	18.00	18.50
O. Iron Rails, Chicago	12.50	12.50	12.50	21.00
O. Iron Rails, Philadelphia	14.00	14.00	15.00	21.50
O. Car Wheels, Chicago	15.00	15.00	18.00	15.50
O. Car Wheels, Philadelphia	17.00	17.00	17.00	17.50
Heavy Steel Scrap, Chicago	9.00	9.00	9.00	14.00

#### PINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia	1.80	1.80	1.80	2.00
Common Iron Bars, Youngstown	1.85	1.85	1.80	1.85
Steel Bars, Tidewater	1.80	1.80	1.80	2.30
Steel Bars, Pittsburgh	1.75	1.75	1.70	2.25
Tank Plates, Tidewater	1.90	1.90	1.80	2.70
Tank Plates, Pittsburgh	1.05	1.10	1.10	2.00
Beams, Tidewater	1.65	1.65	2.05	2.15
Beams, Pittsburgh	1.80	1.80	1.90	2.20
Angles, Tidewater	1.65	1.65	1.95	2.15
Angles, Pittsburgh	1.40	1.40	1.80	2.00
Skelp, Grooved Iron, Pittsburgh	1.50	1.50	1.25	2.25
Skelp, Sheared Iron, Pittsburgh	1.50	1.50	1.25	2.00
Sheets, No. 27, Chicago	3.05	3.05	8.15	3.25
Sheets, No. 27, Pittsburgh	2.85	2.85	2.95	3.00
Barb Wire, f.o.b. Pittsburgh	2.80	2.80	3.60	3.10
Wire Nails, f.o.b. Pittsburgh	2.30	2.30	2.20	2.50
Cut Nails, Mill	1.95	1.95	1.95	2.20

#### METALS:

Copper, New York	16.62 $\frac{1}{4}$	16.50	16.87 $\frac{1}{4}$	18.50
Spelter, St. Louis	3.97 $\frac{1}{4}$	4.00	4.19 $\frac{1}{4}$	5.50
Lead, New York	4.25	4.25	4.00	4.60
Lead, St. Louis	4.20	4.20	3.95	4.52 $\frac{1}{4}$
Tin, New York	50.85	31.50	33.50	31.12 $\frac{1}{4}$
Antimony, Hallett, New York	9.50	9.50	9.50	9.75
Nickel, New York	55.00	55.00	55.00	56.00
Tin Plate, Domestic Bessemer, 100 lbs., New York		4.84	4.84	4.84

## Chicago. (By Telegraph.)

Office of *The Iron Age*, 1205 Fisher Building,  
CHICAGO, August 22, 1900.

In the steady but slow improvement of the Western markets, which has now continued for several weeks, the most conspicuous evidence is now seen in Pig Iron, for which consumers have commenced to inquire and to buy with greater freedom than for many months. In other products the tendency is also toward greater activity. The reduction in Structural Shapes, induced, it is stated, by lax inquiry during July, has been productive of livelier buying, though the opinion is that the best results from the decline will not be realized for some weeks yet. Bars are firmer than a week ago; Iron Bars especially showing the natural effects of limited production, and Steel slowly rising in value as the accompaniment of well filled order books. Users of Plates are showing greater confidence, and manufacturers generally are ordering Merchant Steel in generous lots. The increased trade seems to be the consequence mainly of a restored confidence in prices. The increase in trade is gradual, consumers not buying as heavily as they did in Bars a month ago, but on the other hand not measuring their immediate requirements so accurately and not limiting purchases to absolute needs. There is consequently a disposition toward a stocking up of material. To obtain carload rates estimates of needs are increased 50 to 100 per cent. The deliberate nature of the present recovery from inactivity is viewed with satisfaction, for it has the indices of permanency.

**Pig Iron.**—At least 40,000 tons of Pig Iron was bought on this market during the past week, possibly an amount considerably larger. There will be need of 150,000 tons of Malleable Bessemer among the Western foundries for the season already commenced, and one or two of the larger buyers have closed within the past few days. If past experiences are repeated this entire amount of Iron or most of it will soon be placed. Stove men in the West have also been buying Iron for the season which closes next February. Miscellaneous buying is good. One order recently placed by a melter of low grade Iron was for 6000 to 10,000 tons of No. 3 and No. 4 Foundry. The most gratifying feature of the present movement is its generality, especially in reference to the small melt-

ers. The carload business is the largest in many months. The average size of orders is the largest for perhaps the same length of time. Buying in lots of from 100 to 300 tons is brisk. Concerning prices there is irregularity. There are no settled quotations. Southern furnacemen have shown resistance to further decline, and some large producers have drawn a line on prices, it is stated, beyond which they will not go. For the moment, the sales from that district are going to the smaller producers. If that condition lasts furnacemen now placing orders will soon be filled up, and the tendency of values will be to rise. While quotations openly are lower than a week ago, it is questionable whether actual prices have fallen. Present values are about as follows:

Lake Superior Charcoal.....	\$20.00 to \$21.00
Local Coke Foundry, No. 1.....	16.50 to 17.00
Local Coke Foundry, No. 2.....	15.50 to 16.00
Local Coke Foundry, No. 3.....	15.00 to 15.50
Local Scotch, No. 1.....	16.50 to 17.00
Ohio Strong Softeners, No. 1.....	18.00 to 18.50
Southern Silvery, according to Silicon.....	17.85 to 18.35
Southern Coke, No. 1.....	16.35 to 16.85
Southern Coke, No. 2.....	15.35 to 15.85
Southern Coke, No. 3.....	14.85 to 15.35
Southern Coke, No. 1 Soft.....	16.35 to 16.85
Southern Coke, No. 2 Soft.....	15.35 to 15.85
Foundry Forge.....	14.85 to 14.85
Gray Forge and Mottled.....	13.85 to 14.35
Southern Charcoal Softeners, according to Silicon.....	17.85 to 18.35
Alabama and Georgia Car Wheel.....	21.85 to 22.85
Malleable Bessemer.....	18.00 to 19.00
Standard Bessemer.....	19.00 to 20.00
Jackson County and Kentucky Silvery, 8 per cent. Silicon.....	20.00 to 21.00

**Bars.**—Developments in Bars point to greater strength. There is in some jobbing quarters actual shortness of stocks. Prompt shipments from mill are not always attainable. Many consumers delayed buying just a little too long, and all coming into the market at one time there is not enough stock to go round. This irksomeness may disappear, possibly, but it tends to advance quotations. Iron Bar production among the smaller mills is increasing, because of the continued idleness of larger makers and prices are firmer. Iron Bars are now commonly quoted 1.35c.; Steel Bars are still quoted 1.25c. by some mills, but 1.35c. is a common quotation. Some mills have advanced prices at least \$1 per ton. There is a fair trade in lots of several hundred tons. From store Steel Bars are quoted 1.30c. to 1.75c., and Common Iron from 1.60c. to 1.75c.; Hoops, 1.90c. to 2c. Carload trade is especially brisk.

**Structural Material.**—The effect of the reduction in Shapes has not yet clearly manifested itself. There has been a wide exploitation in the daily papers with much misinformation in connection therewith. The decline is attributed in trade circles to the small volume of business in July, mills gaining quite largely upon their orders. No heavy transactions have followed the reduction as yet; it is too early for that result. Small trade seems to have improved quite noticeably. Revised quotations, mill shipment, are as follows: Beams, Channels and Zees, 15 inches and under, 1.65c.; 18 inches and over, 1.75c.; Angles, 3 inches and over, 1.55c.; Angles, under 3 inches, 1.30c.; Tees, 1.70c.; Universal Plates, 1.30c. From local yards small lots of Beams and Channels are quoted 2.15c. to 2.35c.; Angles, 1.80c. to 1.90c. rates, and Tees, 2c. to 2.20c.

**Plates.**—There has been quite a satisfactory trade in Plates, noted more for the number than the size of orders. Transactions involving from 300 to 400 tons have not been uncommon. Store trade also is improving. Buyers are ordering freely and consumption is believed to be increasing. Prices are steady. Tank Plates are quoted at 1.30c. to 1.35c. from mill, and Flange, 1.60c. to 1.70c. From store Tank is quoted at 1.65c. to 1.75c., and Flange, 1.90c. to 2c.

**Merchant Pipe.**—The busy season for Pipe is at hand, and current trade is in keeping therewith. Orders are numerous for prompt shipment. There is little buying for the future. Quotations are unchanged, as follows:

	Less than In carloads.		carloads.	
	Blk.	Galvd.	Blk.	Galvd.
5/8 to 1/2 inch and 11 to 12 inches.....	61.2	48.7	57.4	43.4
5/8 to 10 inches.....	68.7	56.2	63.9	51.4

**Sheets.**—One order placed within the last few days was for 2000 tons. It was given by a large implement maker. Both small and large transactions have been numerous, the aggregate trade being heavy. Prices have not settled down to an unvarying basis. From store Common No. 27 is quoted 3.10c. to 3.25c.; Nos. 10 to 14, 1.90c. to 2.15c., and No. 16, 2.30c. to 2.40c. Galvanized is quoted 70 and 10 to 75.

**Merchant Steel.**—The past week has broken the record for activity thus far this year. All kinds of consumers are in the market, and a heavy tonnage has been bought. Consumers are ordering from four to 12 months'

needs, and the season transactions have not been uncommon. The tone of the market is reviving quite noticeably. Prices are strengthening slightly, though quatably unchanged. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery Steel, 1.80c. to 2c.; Smooth Finished Tire, 1.80c. to 2c.; Open Hearth Spring Steel, 2.25c. to 2.50c.; Toe Calk, 2.50c. to 2.75c.; Sleigh Shoe, 1.75c. to 2c.; Cutter Shoes, 2.50c. to 2.75c.; Ordinary Tool Steel, 7c. to 7½c.; Special, 13c. and upward.

**Rails and Track Supplies.**—With fair transactions for Light Rails the market is unchanged, as follows: Rails are \$35 to \$37 for Standard Sections, and \$29 to \$33 for Light Rails. Splice Bars, 1.50c. to 1.60c. Spikes are quoted 1.80c. to 1.90c.; Bolts, with Hexagon Nuts, 2.40c. to 2.50c.; Square Nuts, 2.30c. to 2.40c.

**Old Material.**—Railways keep offering a moderate tonnage, which is absorbed, sometimes by dealers, sometimes by consumers, but usually at the same low range that has prevailed for many weeks. Very little material otherwise is appearing. The few transactions current show a variance in prices, but the range is about the same as before, there being no distinctive tendencies, either up or down. The following are approximate quotations per gross ton:

Old Iron Rails.....	\$12.50 to \$13.00
Old Steel Rails, mixed lengths.....	9.50 to 10.00
Old Steel Rails, long lengths.....	10.50 to 11.00
Relaying Rails.....	22.00 to 23.00
Old Car Wheels.....	15.00 to 15.50
Heavy Melting Steel Scrap.....	9.00 to 10.00
Mixed Steel.....	8.00 to 9.00
Iron Fish Plates.....	11.50 to 12.00
Steel or mixed do.....	10.00 to 11.00
Iron Car Axles.....	15.00 to 15.50
Steel Car Axles.....	14.00 to 14.50
No. 1 Railroad Wrought.....	11.50 to 12.00
No. 2 Railroad Wrought.....	10.00 to 10.50
Shafting, Iron and Soft Steel.....	15.00 to 16.00
No. 1 Wrought.....	9.00 to 9.50
No. 1 Country Wrought.....	8.00 to 8.50
No. 1 Mill.....	7.00 to 7.50
No. 2 Mill.....	5.50 to 6.00
No. 1 Busheling.....	8.00 to 8.50
No. 2 Busheling.....	7.00 to 7.50
Iron Car Axle Turnings.....	8.00 to 8.50
Soft Steel Axle Turnings.....	7.00 to 8.00
Machine Shop Turnings.....	6.50 to 7.00
Wrought Drillings.....	6.00 to 6.50
Cast Borings.....	4.00 to 4.50
Mixed Borings and Turnings.....	4.00 to 5.00
No. 1 Boilers, cut.....	8.50 to 9.00
No. 2 Boilers, cut.....	6.00 to 6.50
Boiler and Ship Scrap.....	8.00 to 8.50
No. 1 Cast.....	10.00 to 11.00
No. 2 Cast.....	7.00 to 8.00
Railroad Malleable Cast.....	10.00 to 10.50
Agricultural Malleable Cast.....	9.00 to 9.50

**Metals.**—Copper is selling freely at former quotations, 17c. for Lake and 16½c. for Casting. Lead is quiet at 4.20c. for Desilverized, and 4.30c. for Corroding in 50-ton lots.

## Philadelphia.

Office of *The Iron Age*, Forrest Building, PHILADELPHIA, PA., August 21, 1909.

The Iron and Steel market has a better appearance. There is a well distributed and increasing demand, and the general trend of prices is toward a higher level. Bars are dearer, Plates and Sheets are firmer, and the entire list has a healthy appearance. The export demand is again becoming very important, sales having been made by mills in Eastern Pennsylvania to the extent of at least 10,000 tons of Bars, Plates and Skelp material. The local trade is somewhat puzzling, however, and if it were not for the foreign demand, combined with the suspension of work at a great many mills and furnaces, it is doubtful if the tone of the market would be as firm as it is. Nevertheless, manufacturers can at the present time find a market for almost anything at quoted rates, so that it is not worth while to be hypercritical as to the why and wherefore. A good deal of interest will therefore be manifested in the course of events in the near future, as it is difficult to form distinct ideas as to what turn the market may take before the close of the year. A great many contingencies are in sight, but which will be the first to develop cannot at present be clearly foreseen.

**Plg Iron.**—Practically the market is in the same condition as it was a week ago. The feeling is better to the extent that makers consider that they can maintain prices, but so far they make no progress toward securing an advance. The volume of business is not large, and, when large lots are inquired for, competition shows that some companies are willing to make low quotations to secure business. Several lots of 8000 to 10,000 tons each have been bid on, and it shows that the equivalent of \$16 for No. 2 X could be shaded quite considerably. The points of delivery, however, were in New Jersey, New England and Eastern New York. Philadelphia buyers are asking for 1000 to 2000 ton lots, and it is thought that about \$16 will take the business, but until the bids are opened nothing definite can be said. For

smaller lots \$16.25 to \$16.50 is quoted, and for special brands \$17 is asked and paid. It is a slow, dragging market, however, and even trifling advances are hard to secure, although, as we said before, sellers are equally stubborn in resisting a decline. The great curtailment in the production of Pig Iron ought to make itself felt soon, but as yet there are no evidences of scarcity, all grades being in full supply at virtually unchanged prices. The impression seems to be that prices ought to improve, but the movement in that direction is very slow, although, if the market should become at all active, it is not unlikely that there might be a sudden marking up, particularly as the decrease in production is believed to be at the rate of over 2,000,000 or more tons per annum from the high point reached some time ago. Meanwhile the average range of prices for Philadelphia or nearby deliveries is about as follows: No. 1 X Foundry, \$17 to \$18; No. 2 X Foundry, \$16 to \$17; No. 2 Plain, \$15.50 to \$16; Mill Irons, \$14.50 to \$15; Ordinary, \$14 to \$14.50; Basic, \$14.50 to \$15; Bessemer, \$15.50 to \$16; Low Phosphorus, \$24 to \$25.

**Billets.**—A considerable amount of business is being done, mostly in small lots, but some sales have been made in lots of 5000 tons and upward, prices varying according to analysis. The Diamond State Steel Company are said to have sold something like 20,000 tons of Open Hearth Steel at from \$22.50 to \$24. Bessemer is quoted at \$20.50, but it could be done at \$20 if the right kind of bids could be had; but a large proportion of the business is now being done by local and nearby mills, Open Hearth Steel having the preference. The Diamond State Steel Company, with a capacity of 1000 tons per day, may start their new plant this week, as they are now ready for immediate operation.

**Plates.**—The demand keeps up very encouragingly, the incoming orders being fully equal and in some cases in excess of the deliveries. Some fair sized lots are being taken, including several for export, for which there appears to be an increasing demand. Prices are a shade dearer, but on lots of 500 tons and upward it is probable that last week's figures would be accepted, although the tone of the market is unquestionably firm. For ordinary business quotations are about as follows: Plates,  $\frac{1}{4}$ -inch and thicker, 1.30c. to 1.35c.; Universals, 1.35c. to 1.40c.; Shell, 1.45c. to 1.55c.; Flange, 1.60c. to 1.65c.; Charcoal Iron Plates, C. H. No. 1, 2.40c.; Best Flange, 2.90c.; Fire Box, 3.40c.

**Structural Material.**—The drop of \$8 per ton does not seem to have helped business much, unless it may have benefited some of the promoters of the scheme who had certain specific orders in prospect. Mills had plenty of business at the old rates, and are not getting any more at the new rates; consequently some are inclined to think the reduction was uncalled for. Be that as it may, quotations are now changed to the following figures: Beams and Channels, 15-inch and under, 1.60c. to 1.65c.; Angles, 3 to 6 inches, 1.30c. to 1.40c.

**Bars.**—The demand for Bars is very active, and prices are at least \$1 per ton dearer than they were a week ago. Large sales have been made on foreign account, probably 10,000 tons in all, so that the local demand is not sought for as much as it was a few weeks ago. It must be remembered, however, that a great many mills are shut down pending an adjustment of the labor scale, so that the scarcity of Bars is to some extent abnormal. Prices to-day for city and nearby points are from 1.30c. to 1.40c. for Refined Bars, and 1.20c. to 1.25c. for Steel.

**Sheets.**—The demand is of the same general character as reported for some weeks past, active and strong for Thin Sheets, dull and irregular for the lower numbers, say from No. 14 down. Prices are as follows for Best Sheets (Common Sheets two-tenths less): No. 10, 2.25c.; No. 14, 2.35c.; No. 16, 2.50c.; Nos. 18-20, 3c.; Nos. 21-24, 3.10c.; Nos. 26, 27, 3.20c.; No. 28, 3.30c.

**Old Material.**—The suspension of work at so many mills is rather discouraging to holders of Scrap Material, but prices are not changed much, as they have already been forced to about the lowest figures possible. Steel Scrap is doing better, with sales at \$11 for Heavy Melting Stock and \$13 for Rails, but holders are now asking \$1 advance on the prices named. A bid of \$11 was made for 5000 tons of Old Ship Plates, but not yet accepted. Bids and offers are about as follows for deliveries in buyers' yards: Choice Railroad Scrap, \$14 to \$15; No. 1 Yard Scrap, \$11 to \$12; No. 2 Light Scrap, \$10.50 to \$11; Machinery Cast, \$13.50 to \$14.50; Heavy Steel Scrap, \$11.50 to \$12.50; Old Iron Rails, \$14 to \$15; Old Steel Rails, \$13 to \$14; Wrought Turnings, \$8 to \$8.50; Cast Borings, \$6.50 to \$7; Old Car Wheels, \$17 to \$18; Iron Axles, \$15 to \$16; Steel Axles, \$16 to \$17.

Pilling & Crane of Philadelphia bought in at auction to-day 4500 tons of Iron Ore, for account of whom it may concern, at 4 $\frac{1}{4}$ c. per unit.

## Cleveland.

CLEVELAND, OHIO, August 21, 1900.

**Iron Ore.**—Last week a rumor had it that the Stephens Mine in the Lake Superior District had been sold by John D. Rockefeller to the Oliver Mining Company, who are affiliated with the Carnegie Steel Company. This has since been confirmed, and it may now be stated with positiveness that peace has been patched up between the Rockefeller and Carnegie interests, evidence of which is seen in the agreement attending the sale. A provision is made in the transfer that the Ore, amounting now to about 1,250,000 tons a year, shall be carried on the Rockefeller railroad to the shipping ports, and shall be brought down the lakes in the boats of the Bessemer Steamship Company, of whom Mr. Rockefeller is the head. It seems that this lease is to extend over a period of 50 years. The lake freights are to be 50c. for carrying the Ore, the owner to pay the unloading charges. Vesselmen are apprehensive lest this agreement have a benumbing effect upon the general lake freights on Ore. A 50c. carrying rate with unloading charges in addition means this year about 68c. freight. When placed against the \$1.25 rate of this season this is small, but when compared with the rate which prevailed in 1899 it is not to be scoffed at. Those owners whose tonnage is large are satisfied that this year's rate shall be made upon the basis of the Rockefeller-Carnegie agreement. They had not counted on much better than a 70c. freight, the conditions as to Ore movement being now as they are. It has been generally conceded that when next year's business is contracted for it would be on a basis of either 65c. or 70c. However, the agreement will have no immediate effect upon the market for next year. The vesselmen realize that this is a long time contract, and none need to be alarmed by it, there being no occasion for a stampede. In consequence they are waiting quietly for the future to develop the market conditions more clearly than they now are. Two weeks ago a contract was made for the movement of a small block of Ore from the head of Lake Superior to Ohio at 75c. It has been expected that both Marquette and Escanaba would be lined up on that rate, but no cargoes have presented themselves from either of these ports, hence no new rates have been made. The shippers are holding nothing back on account of the rates, they simply have not the stuff to move and are not bidding for boats. Nothing is being done in sales of Ore, either for present or future delivery.

**Pig Iron.**—The market on Pig Iron continues to look up a little on business for the future. Inquiries are coming in steadily and sales are resulting. The sales are not heavy so far, being in lots of 500 to 1000 tons, most of these being for delivery at various times extending through the last half of the year. These sales are being made on a basis of \$15 and \$15.50 for Nos. 1 and 2 Valley furnace. This is about the bottom price, although there are reports that a less price than that has been taken. In Bessemer almost nothing is being done. There are no demands for Iron for spot delivery, and little if any inquiry for future business.

**Finished Materials.**—In a good many ways this week has shown a revival of interest in many lines of Finished Material. The market appears to have taken a brace all around, and while one rate has been cut, owing to strife among the producers, all of the others are holding firm and even advancing slightly. In addition to this the volume of business has been very largely increased, this being one of the sensational weeks of the year for sales. Buyers are taking hold of all grades with increased interest.

**Plates.**—Since the last report was made sales aggregating over 30,000 tons have been made in Plates. Influenced by the low prices the buyers have been supplying themselves for the period preceding January 1, and some of the sales are for delivery until late in December. These sales make up a part of the 30,000 tons mentioned. Another item in this is the sale of the 10,000 tons for the Gilchrist boats, which contract was obtained by the Carnegie Company. Now an added interest is taken in the Plate market, from a report that a company of Eastern capitalists have contracted with the American Shipbuilding Company for four canal sized steel steamers, that are to be used in the coasting trade and between the lakes on the Atlantic. These will require about 6000 tons of Ship Plates, and proposals for this stuff have already been asked.

**Bars.**—While the prices were lower on Bars than they now are some of the mills sold out their entire capacity. Now more business is developing, and those who have the stuff to sell are able to dictate in a small degree, to the buyers. The result is that the market is firmer. A fair quotation would be about 1.10c. on Bars, the market being strong at that figure.

**Beams and Channels.**—The decline in the price of Beams and Channels and Angles, as well came as a complete surprise. It is a little too early yet to ascertain any effect, but it is expected to bring out a good business. The Lake Shore Railroad, which has been contemplating the erection of a bridge that would require 1200 tons of Steel, is expected now to go on the market and buy. Other business in Structural Iron is picking up also, and the architects of Cleveland speak of having more in sight now than they have had for months.

**Old Iron.**—The speculators are now at work on the Scrap market, buying in a good deal of the material that is offered at current prices, under the belief that this market, like many of the others, has struck rock bottom and will soon commence to rise. About all the sales that have been made here of late have been to speculators, although there is a better demand for Scrap than has been seen since the dullness in the Iron trade set in.

### St. Louis. (By Telegraph.)

Office of *The Iron Age*, 1205 Chemical Building, St. Louis, August 22, 1900.

**Pig Iron.**—A fair number of orders have been received by the trade. Individual tonnage has not been large, however. Inquiries are slightly on the increase, and tonnage mentioned therein is greater than that specified in instances immediately preceding. Some correspondents clearly say that they are considering supplies for 30 days only. Agricultural implement makers are among the inquirers for figures, but in certain cases are at sea as to what course to pursue. Local trade is comparatively quiet, more interest being shown at other points in this territory. We understand that 5000 tons of No. 3 Foundry have been sold for export by a Southern producer at a price netting \$11 at the furnace. There is practically no uniformity as to price, but we note a reduction of 50c. in No. 1, both Foundry and Soft. We quote, f.o.b. cars St. Louis:

Southern, No. 1 Foundry	\$15.75 to \$16.00
Southern, No. 2 Foundry	15.25 to 15.50
Southern, No. 3 Foundry	14.25 to 14.50
No. 1 Soft	15.75 to 16.00
No. 2 Soft	15.25 to 15.50
Gray Forge	13.25 to 13.50

**Bars.**—Mill prices show an advance. Inquiry shows a better feeling in all branches of the trade at the present time. Nearby mills remain closed, with an occasional exception, in which instance it is said the scale was signed in order to complete old contracts. Other mills say they will not sign the scale in the present condition of the market. Some additional tonnage offered to mills at recent low prices has been refused acceptance. Order books are now without doubt open only for more desirable business. Mills are quoting 1.35c. to 1.40c., base, half extras, for Steel; 1.45c. to 1.50c. for Iron, half extras. Jobbers quote 1.75c. for Iron and 1.90c., base, for Steel, full extras.

**Rails and Track Supplies.**—Rails of Heavy Section are rather quiet, more movement being seen in Light Sections. Track Supplies are in normal demand at unchanged prices. We quote Splice Bars, 1.80c.; Track Bolts, with Square Nuts, 2.50c.; with Hexagon Nuts, 2.70c.; Spikes, 1.80c.; Links and Pins, 2c.

**Pig Lead.**—The market is exceedingly dull. Supplies are not made generally for more than a month's run. Desilverized remains at 4.20c. and Soft Missouri at 4.15c. Lead Ore also remained at \$47 per ton.

**Spelter.**—A slight weakness is noted. Last sales were made at 4c., but smelters' offer the past few days equaling 3.97½c. did not bring out customers' order. Demand is limited. Ordinary top grades of Zinc Ore were firm at \$28 per ton. An exceptional lot, however, commanded \$20.

### Cincinnati. (By Telegraph.)

Office of *The Iron Age*, Fifth and Main streets, Cincinnati, August 22, 1900.

With the publication of the minimum prices in last week's *Iron Age* the bottom of the market seems to have been reached, and from that basis there is to-day a decidedly reactionary feeling. For the first week in some months prices not only have gone no lower but have actually shown a tendency to stiffen up. It is not thought likely that very much Iron, especially of the better grade, could be bought at even to-day's maximum quotation, and this could be positively affirmed with reference to contracts which contemplated deliveries reaching very far into the future. The leading Southern interest is holding on the basis of \$11.50, Birmingham, for No. 2 Foundry, and \$10 for No. 4. Some other Southern furnaces insist that they will not go below \$12.50 for

No. 2, and say they can well afford to wait for the reaction, which is bound to come. Buyers, too, are showing an awakening interest in Pig Iron, and there are also signs that they would like to contract largely on the basis of the present minimum. The number of orders, especially for Northern Iron, has increased largely, and while the tonnage is yet comparatively small it is nevertheless much larger than it has been for some months. There is to be further restriction of production by the blowing out of more furnaces, and with the consumption equal at least to 80 per cent. of what it was last year the optimistic element is again figuring out a strong statistical situation. On the whole the conditions are better, and the protracted dullness seems to be giving away in favor of more decided action. Freight rate from Birmingham is \$3.25 to this point; from the Hanging Rock district \$1. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1	\$14.75 to \$15.00
Southern Coke, No. 2	13.75 to 14.00
Southern Coke, No. 3	13.00 to 13.25
Southern Coke, No. 4	12.00 to 12.50
Southern Coke, No. 1 Soft	14.75 to 15.00
Southern Coke, No. 2 Soft	13.75 to 14.00
Southern Coke, Gray Forge	12.00 to 12.50
Southern Coke, Mottled	12.00 to 12.50
Ohio Silver, No. 1	18.50 to 19.00
Ohio Silver, No. 2	17.50 to 18.00
Lake Superior Coke, No. 1	... to 15.00
Lake Superior Coke, No. 2	... to 14.00
Lake Superior Coke, No. 3	... to 13.00

#### Car Wheel and Malleable Irons.

Standard Southern Car Wheel, Chilling	grades	\$22.50 to \$23.25
Standard Southern Car Wheel, No. 2	...	21.50 to 22.00
Lake Superior Car Wheel and Malleable	...	20.00 to 21.50

**Plates and Bars.**—While nominally there is no change in the price-list, yet at the quotations given the market is firmer, and an increase of \$2 per ton obtained in some cases. We quote, f.o.b. Cincinnati: Iron Bars, carload lots, 1.60c., with half extras; in small lots, 2c., with full extras; Bar Steel, carload lots, 1.70c., with half extras; small lots, 2c., with full extras; Iron Bar Angles, 1½ x 3-16 inch and larger, in car lots, 1.75c.; small, 2.25c.; Sheets, No. 10, 2.25c.; No. 27, Steel, 3c.; Plates, 2c. to 2.25c.

**Old Material.**—The market is quiet and unchanged. We quote dealers' buying prices per gross ton, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, \$11 to \$12; Cast Railroad and Machine Scrap, \$10 to \$11; Iron Axles, \$14 to \$15; Iron Rails, \$12 to \$13; Car Wheels, \$14 to \$15.

### Birmingham.

BIRMINGHAM, ALA., August 20, 1900.

Not infrequently your correspondent is halted and the query put to him, "What is Iron worth?" and he is compelled to acknowledge that he is a know nothing on that point, and he confesses in advance that very little information as to prices is obtainable. The inference to be drawn, therefore, is that they are lean. We have some sellers who are not meeting the market for home trade, while there are others who are accepting current values whenever a profit is shown. But there is a strong disposition to keep "mum" on transactions that fail to show good profit. For instance, from a perfectly reliable source it came to your correspondent that a sale had been made of 400 tons of Iron. The seller was interviewed and hints thrown out, but there was a manifest inclination to ignore that sale, and nothing whatever concerning it could be obtained. Just a chance remark induced the belief that it was on a basis of \$9.50 for Gray Forge. Your correspondent saw a telegram from a Western sales agent declaring that an agent of another competing interest was offering No. 2 Foundry Iron at \$11 here. The agent was wired that he had no authority to make such a price, and orders would not be accepted.

There are more inquiries for Iron, but the actual transactions do not keep pace with them. There are plenty of bids, but only a moiety of them are accepted. One bid of this character was at \$8.50 for Gray Forge and \$9.05 for No. 4 and No. 3 Foundry. Some were higher and some were accepted, but just on what basis is mere guess work. There seems to be an understanding between buyer and seller as to prices, "but the secret you must keep." Quotations given are on the basis of \$11.50 for No. 2 Foundry and \$10.25, \$10.50, for Gray Forge. As the difference between grades is now marked at 50c., that would put No. 3 Foundry at \$11. There is grave doubt as to the prevalence of any such prices, except in carload or medium size orders. In connection with this it can be stated that No. 1 Foundry sold at \$14. Such prices will not keep. They leak out, but cannot be quoted as market, as transactions are insignificant.

The Steel plant has made some sales of Billets and Slabs at figures that are "P. T." They can make Billets now as small as 1¼ inches, while heretofore the minimum size has been 3 inches.

The steel casting foundry of the Tennessee Company will commence operations this week, and much concerning it is expected in the way of a successful business venture. South of St. Louis there is no other plant of a similar kind, and the field of opportunities before it will be thoroughly gleaned in the expectation of reaping a paying harvest. There is nothing in the way of its successful, and, therefore, profitable operation.

The export trade has been playing a "hide and seek game." One week it is "off," and before one's report is printed, it has loomed up big, and come to the front with comfortable takings. Since the first day of this month the registered orders reported for this trade aggregate approximately 65,000 tons. It is announced on the same authorities that every ton has been covered by engagements of ocean room, except 2000 tons. Some shipping agents assert that the sales aggregate 100,000 tons. These export sales account in part for the indifference to bids that would otherwise probably be accepted. It is a matter of surprise that these sales should be made in the face of the comparatively high freight rates prevailing, but that it is a fact, your correspondent has no doubt. Of course, as to delivery, the sales are spread out over the remaining months of the year. It is another significant fact that just as many orders are refused as are accepted. It frequently happens that ocean room to a buying point is not available, and the order has to be turned down, though the price is acceptable. If ocean room was obtainable the export trade could and would be largely increased.

A tour of the Birmingham rolling mills was necessary to appreciate the upheaval going on there in the way of improvements, and here is what has been and what is being done there. The Steel plant has been reconstructed. The old furnaces have been torn away and new ones, heavier and stronger, installed and the number of gas producers increased. The Fort Paine outfit has been put up there, consisting of 14 steam boilers and six gas producers, the old boilers being removed. Both puddling mills have been overhauled and all the latest labor saving devices inaugurated, as well as those securing greatest efficiency in results. Four gas heating furnaces have been built on new improved plans, and these will be used at Bar mill and Guide mills. Six hundred feet of new gas sewer, 4 x 6 feet, has been built to supply these furnaces. Two new Bar mills have been added, as well as Sheet, Guide, Plate and fire bed mills. Plate shears, weighing 150,000 pounds, have been put in, as well as 112 foot squaring shears. Then two hydraulic doubling machines have been erected, as also two cold rolling mills—the rolls being 24 inches by 40 feet. The new engine for the Plate mills has a foundation in which 100,000 brick was used, and is 1500 horse-power. Then there is a new patent charging machine for Slabs, Billets and Ingots. The radical character of the improvements made is almost equal to the building of a new mill. To all these add an electric light plant, and we have a rehabilitated up to date and practically all new mill.

As an example of successful furnace practice, two results are given, taken at random: One output of 145 tons, of which 3 tons only were Gray Forge; one output of 140 tons, of which none was Gray Forge, and two only of No. 3. It is unnecessary to say this is not the prevailing rate of percentage obtained.

## Pittsburgh.

Office of *The Iron Age*, Hamilton Building, Pittsburgh, August 22, 1900.

(By Telegraph.)

**Pig Iron.**—The market is dull, and little Pig Iron of any kind is moving. It is claimed that the agreement of the Valley furnaces to close down all the stacks in the Mahoning Valley, except Andrews and Hitchcock and Brier Hill, will be carried out. A heavy decrease in production will help the Pig Iron market more than anything else. There are no large inquiries in the market for Bessemer iron, but several small lots of 500 to 1000 tons have sold at \$15 to \$15.25, Pittsburgh. The nominal price in the Valley is \$15 at furnace. There is very little doing in Forge Iron, and it is held at about \$14, but several sales are reported at \$13.50, Pittsburgh. Foundry Iron is also quiet, and prices are weak. We quote Northern No. 2 at \$15, Pittsburgh, but on a firm offer this could be shaded.

**Steel.**—There is not much inquiry for Steel, nearly all consumers being covered by special contracts, on a sliding scale basis. The nominal price of Bessemer Bil-

lets is \$18, Pittsburgh, but on actual business this has been materially shaded. Basic Steel is being offered freely, and can be bought as low as Bessemer.

**Sheet Bars.**—There is some inquiry for Sheet and Tin Bars, and some sales have recently been made in this market. We quote Sheet Bars, long lengths, at \$21 to \$22, and Tin Bars cut to length at \$23, Pittsburgh. We note a sale of 500 tons of Tin Bars at the latter price.

(By Mail.)

The Iron trade is showing perceptible improvement in volume of tonnage, but prices are very little, if any, better. It is evident that stocks of goods all over the country are light, and this is shown by the character of the orders being placed, nearly all of which are for prompt shipment. It is certain that a heavy tonnage will be placed just as soon as buyers are convinced that it is a safe time to buy and that prices will not be any lower. The improvement in trade has not yet extended to Pig Iron and Billets, both of which are dull, low prices being made on the few small lots that are being sold. Bessemer Pig is practically the same price, \$15 a ton, Pittsburgh or Valley. Billets are nominally \$18, but in special cases this price has been very materially shaded. In Structural Material, as noted last week, prices have been reduced 4-10c. per lb. Plates are in good demand, some very large tonnage having recently been placed; but at extremely low prices. Both Steel and Iron Bars are firmer, and there is a good demand. Sheets are also much better in demand, but prices show no improvement. Iron Skelp is higher, and there has been a good deal of demand in the past week or two, particularly from Eastern Pipe mills. Pipes and Tubes are also in better demand, and the tone of the market is much firmer. Coke is dull, and so is Scrap. Taken as a whole, the situation is decidedly better, and there is a much more hopeful feeling. Iron and Steel makers are much disappointed that the railroads refused to make low rates on material for export. At a meeting last week in New York between representatives of the leading lines and the heads of some of the largest Iron and Steel interests, the situation was gone over and the railroads all stated that it would be impossible to make specially low rates on material for export; but that it would have to take the same rate as domestic business. It is probable that the matter will be further agitated, but it is hardly likely anything will be accomplished. The Tin Plate, Puddling and Bar mill scales are still unsettled, but it is probable that the first named will be fixed up at the next meeting, to be held in a short time. The Puddling and Bar scales may require a good deal of time before they are finally arranged.

**Ferromanganese.**—We quote 80 per cent. Ferro at \$85 in large lots, delivered. For small lots \$100 is quoted.

**Muck Bar.**—The shut down of nearly all the Western mills rolling Muck Bar has caused a decided scarcity, and prices are higher. Western Muck Bar has sold at \$27.50, Pittsburgh, and it is not probable that this price could be shaded. However, Eastern Muck Bar could be laid down in Pittsburgh at a lower price.

**Structural Material.**—Last Wednesday the six mills comprising the Beam Association were in telephone communication and, as a result, prices were reduced 4-10c. per lb. It is hoped this will result in more tonnage being placed. The leading Bridge Interest are securing a very large business, and have recently taken some nice foreign contracts. There is a good deal of inquiry for Structural Material, and the next three or four months will likely bring out considerable tonnage. We quote: Beams and Channels up to 15-inch, 1.50c.; over 15-inch, 1.60c.; Angles, 3 to 6 inches inclusive, 1.40c.; over 6 inches, 1.50c.; under 3 inches, 1.30c.; Zees, 1.50c.; Tees, 1.55c.; Bars, 1.05c. to 1.10c.; Universal and Sheared Plates, 1.05c. to 1.10c., all f.o.b. Pittsburgh.

**Sheets.**—There is a very much better demand for Sheets, and a large tonnage is being placed. Some of the smaller outside mills are pretty well filled up, having all the orders they can take care of for the next six weeks or two months. Prices on Sheets have not as yet shown any improvement, but the tone of the market is stronger. We quote No. 28 Black Sheets, one pass, at 2.90c. and No. 27 at 2.85c. In exceptional cases, and for very desirable tonnage, these prices are being shaded. On the other hand, it is true that as high as 3.15c. for No. 27 and 3.20c. for No. 28 is being quoted. There is also a good demand for Galvanized Sheets, and some large orders are being placed. We quote Galvanized at 70 and 10 and 2½ per cent, usual freight allowance, but

note that in some cases an additional 2½ per cent. is allowed.

**Plates.**—Some heavy orders for Plates for lake boats have recently been placed, much of this business going to a local interest. Prices on these special contracts are low. The general market on Tank Plate, ¼-inch and heavier, is 1.05c. to 1.10c., but in exceptional cases this has been shaded. We quote Shell at 1.15c. to 1.20c.; Flange, 1.25c. to 1.30c.; Fire Box, 2½c. to 3c., according to quality.

**Bars.**—Some of the leading Bar mills are pretty well sold up and are firmer in their ideas as to prices, quoting 1.10c. minimum. On the other hand, several mills are shading this price for desirable tonnage. There is no doubt but that the shut down of the Bar mills, if it continues any length of time, will stiffen up prices. In fact, it has already done so on Iron Bars, which are higher than they were a week or two ago. A few independent mills in the Central West that have signed the scale are running, but more than 90 per cent. of the Iron Bar capacity is idle. We quote Steel Bars at 1.05c. to 1.10c., but note that some mills are holding firmly for the higher price. We quote Iron Bars at 1.25c. to 1.30c. at mill, equal to 1.30c. to 1.35c., Pittsburgh. For high grade Refined Iron Bars as high as 1.75c. is being quoted.

**Merchant Steel.**—Demand is a little better, but is still very short of being large enough to keep all the mills full of work. Prices are weak, and in exceptional cases very low figures have been made. We quote: Tire Steel, 1.60c.; Toe Calk, 1.75c.; Open Hearth Spring, 2.25c., base; Open Hearth Machinery, 2.50c., base; Rolled Lay Steel, 2.75c.; Hammered, 3c.; Cold Drawn Steel Shafting, 42 per cent. off list; Black Vehicle Springs, oil tempered, 4.50c.; Tool Steel, ordinary grades, 7c., base; extra grades, 12c., base; terms 60 days, 2 per cent. off for cash in 10 days, with 25c. freight allowance on Tool Steel.

**Skelp.**—The shut down of so many mills in the West rolling Iron Skelp has caused a sharp advance in prices, and Grooved and Sheared Iron Skelp has sold as high as 1.50c. to 1.55c., the latter for wide sizes. There has been a heavy demand for Iron Skelp in the past two or three weeks, mostly from Eastern Pipe mills. Prices on Steel Skelp are much lower than for Iron, and we quote Grooved and Sheared Steel Skelp at 1.25c. to 1.35c. at mill. We note a sale of 1500 tons of Grooved Iron Skelp at 1.55c., delivered f.o.b. Pittsburgh.

**Pipes and Tubes.**—There is a good deal better demand for Tubular goods, and the tone of the market is much stronger. The outside mills are reported to be pretty well filled up, some of them having all the orders on their books that they can fill in the next month or six weeks. Prices given below are firmly held, being shaded only in exceptional cases. In carload lots to consumers, we quote:

Merchant Pipe.		Black.	Galvd.
		Per cent.	Per cent.
1½ to 2½ inch and 11 and 12 inch.....	63	50½	
¾ to 10 inch.....	70½	58	
<i>Casing.</i>		8 & S.	
		Per cent.	
2 to 2½ inch.....		47½	
3 to 4½ and 7½ to 12½ inch.....		56	
4½ to 7½ inch.....		60	
<i>Boiler Tubes.</i>			
	Up to 22 feet.	22 feet and over.	
	Per cent.	Per cent.	
Steel.			
1 inch to 1½ inch and 2½ inch....	55	50	
1½ to 2½ inch.....	51	46	
2½ to 13 inch.....	62	58	
Iron.			
1 inch to 1½ inch and 2½ inch....	53	49	
1½ inch to 2½ inch.....	49	44	
2½ inch to 13 inch.....	60	55	

To jobbers in carload lots prices are about 5 per cent. lower than the above.

**Coke.**—The Coke trade continues dull, and output is being steadily decreased. Last week out of 20,420 ovens in the Connellsburg region, 14,013 were active and 6407 idle. The output was 143,980 tons, a falling off over the previous week of nearly 10,000 tons. There is practically no demand for either Furnace or Foundry Coke. We quote strictly Connellsburg Furnace Coke at \$2; Foundry, \$2.75, and Crushed at \$3.25 to \$3.50. For Coke made outside the Connellsburg region much lower prices than the above are quoted.

### The British Iron Market.

**Summary.**—The holiday at the beginning of this week caused a general cessation of work, but beyond this there is no very marked feature to report in the position of the Iron and Steel trades of the country. Although there has been a somewhat better feeling in Middlesbrough, business is still rather restricted, and in those districts where reductions in prices have been made recently, lit-

tle improvement in the volume of new work coming forward is apparent as the result. At the same time there is a healthy tone pervading negotiations, and the outlook is far from discouraging. The engineering trade continues well employed in most branches, the only falling off being in the textile section. In the shipbuilding industry there is no change during the week to report. American advices are more favorable, but Continental reports are not quite so satisfactory as far as France and Belgium are concerned. In Germany, however, business continues good.

**Pig Iron.**—Business in Pig Iron is still somewhat slow; but prices are fairly well maintained, and, indeed, in Middlesbrough, notwithstanding the holiday, the market has moved in favor of sellers, and makers' prices have been put up, No. 3 having been quoted at 70 shillings, while 69 shillings 6 pence has been readily paid. There has also been an improvement in warrant prices in this district, a movement fully justified by the very small stocks held. It is calculated to strengthen the position of manufacturers, who are by no means anxious to sell, believing that the autumn will bring a brisk trade and better prices. Hematite prices remain very firm, but there is little available Iron for sale. In Barrow the demand is brisk, local Steel makers being large consumers at the present time. In Lancashire business is small, and prices show little change, the tendency being, if anything, rather easier. Staffordshire makers, however, experience a steady demand for prompt deliveries, although inquiries for forward supplies are few. In the Glasgow warrant market very little has been doing. Prices have fluctuated a good deal, and Scotch now stands at 73 shillings 2 pence, as against 72 shillings a week ago. The average price of Pig in Scotland during the last three months has been declared at 68 shillings, which means a reduction in blast furnace men's wages.

**Manufactured Iron and Steel.**—Most of the works in the finished branches of the Iron and Steel trades continue well employed, but it cannot be denied that new business is coming forward rather too slowly to replace orders which are being completed. Buyers appear to be waiting further reductions in prices before giving out their orders, but no more concessions are reported, except in Middlesbrough Rails, which have been put down 5 shillings, and are now quoted at from £7 5s. to £7 10s. Iron Ship Plates in the same district, on the other hand, have been put up 2 shillings 6 pence to a minimum of £8 2s. 6d., it having been recognized that the recent reduction to £8 was too heavy a fall. In the Midlands the Bar Iron makers are maintaining their full rates as a rule, and, although business has apparently been done in South Staffordshire Common Iron in exceptional cases at £10 5s., most firms refuse to go below £10 10s. The Lancashire Steel makers, however, are quoting Billets as low as £6 10s. for anything like quantities, in order to meet the competition of American manufacturers. Some of the principal establishments in Sheffield are reported to have remained closed during this week.

**Engineering and Shipbuilding.**—In the engineering trades the position remains without any really material change. Full employment is still generally maintained, and the leading branches are well supplied with work for a considerable time ahead, any real slackening off being chiefly among the textile machine trades and other allied industries. The wages question, however, appears to be assuming a more serious aspect, and in some quarters there are apprehensions that the demands of the unions may lead to renewed trouble between employers and the workmen. The shipbuilding industry presents few new features, only one or two small orders being reported.

**Foreign.**—Our New York correspondent cables that there is a better demand all around; but little confidence is apparently felt in the continuance of the improvement, and prices of Pig Iron are practically unchanged. Finished Material is unchanged. In regard to the Continent, a somewhat weaker tendency is noticeable in the Finished Iron trade in France and Belgium. In Germany the position is unchanged.

**Comparison of Prices.**—The annexed table shows the current prices compared with those of last week, and of the corresponding period last year:

	Aug. 9, 1900. s. d.	Aug. 2, 1900. s. d.	Aug. 10, 1899. s. d.
<i>Iron Ore—</i>			
Rubio, Middlesbrough.....	21 9	21 9	17 6
Rubio, Cardiff.....	20 6	20 6	15 9
Pottery Mine, North Staffordshire.....	20 6	20 6	14 6
Hematite, West Coast (at mines).....	17 6	17 6	16 0
<i>Pig Iron—</i>			
No. 3 Foundry, Middlesbrough.....	60 9	69 6	65 0
Warrants.....	70 0	69 9	64 10½
Scotch Warrants, Glasgow.....	73 2	73 0	68 1
Hematite Warrants, West Coast.....	82 9	82 9	75 0
Cold Blast (Foundry), South Staffordshire.....	130 0	130 0	110 0
Welsh Hematite, Cardiff.....	84 0	84 0	74 6

Manufactured Iron and Steel—	£	s.	d.	£	s.	d.	£	s.	d.
Marked Bars, South Staffordshire	11	10	0	11	10	0	9	0	0
Common Bars	10	15	0	10	15	0	8	10	0
Steel Rails, Middlesbrough	7	7	6	7	10	0	6	7	6
Steel Rails, West Coast	7	5	0	7	5	0	6	5	0
Steel Rails, Cardiff	7	0	0	7	0	0	6	5	6
Steel Angles (eng.), Middlesbrough	8	10	0	8	10	0	7	2	6
Steel Angles (eng.), Glasgow	8	2	5	8	2	6	7	2	6
Steel Plates (ship), Middlesbrough	8	0	0	8	0	0	7	12	6
Steel Plates (ship), Glasgow	8	2	6	8	2	6	7	15	0
Tin Plates, Bessemer IC Cokes, South Wales	14	6	0	14	6	0	16	0	0

—Iron and Coal Trade Review, August 10, 1900.

## New York.

Office of *The Iron Age*, 222-228 William street, New York, August 22, 1900.

**Pig Iron.**—There has been considerably more inquiry, but while some sellers, having disposed of good quantities, show a disposition to hold for better prices, others are still very eager. The market is, therefore, rather irregular. Reports are current that one large consumer in this State has taken 10,000 tons, and that another in this vicinity has closed for 10,000 tons. The latter report, however, is pronounced improbable. There is talk of some large sales for export of Southern Iron. Quotations are as follows at tidewater: Lehigh, Schuylkill and Virginia Irons, No. 1, \$16.50 to \$18; No. 2 X, \$15.50 to \$17; No. 2 Plain, \$15 to \$15.50; Gray Forge, \$14 to \$15. Tennessee and Alabama brands, No. 1 Foundry, \$17 to \$17.25; No. 2 Foundry, \$15.75 to \$16.50; No. 1 Soft, \$17.50; No. 2 Soft, \$16 to \$16.50; No. 3 Foundry, \$14.75 to \$15.25; No. 4 Foundry, \$13.75 to \$14.25; Gray Forge, \$13.75 to \$14.25.

**Cast Iron Pipe.**—The demand is increasing, but prices remain in a demoralized condition. We quote \$25 to \$25.50 per gross ton, at tidewater for 8-inch.

**Steel Rails.**—The market is very dull. Reports are current of offers to sell at lower prices for early delivery, but we are unable to substantiate them. Nominally, the quotation remains at \$35 at mill, for standard Sections. We quote Track Material nominally 1.80c. to 1.90c. for Spikes, 1.50c. to 1.60c. for Splice Bars, 2.25c. to 2.40c. for Square and 2.35c. to 2.50c. for Hexagon Bolts.

**Finished Iron and Steel.**—No contracts of any special magnitude have been placed, the awards of the material for the East River bridge being delayed. Some additional work for the Japanese Government is on the eve of being closed. We cannot learn that any marked increase in business has followed the rather sudden announcement of a cut in the prices of Structural Material. Of course, deliveries on older contracts are being readjusted on the new basis of prices and some tonnage has been placed which was held in abeyance in anticipation of a decline. We quote as follows at tidewater: Beams, Channels and Zees, 1.65c. to 1.70c.; Angles, 1.30c. to 1.40c.; Tees, 1.65c. to 1.75c.; Bulb Angles and Deck Beams, 1.90c. to 2c.; Universal Mill Plates, 1.25c. to 1.30c. Sheared Steel Plates are 1.20c. to 1.30c. for Tank, 1.35c. to 1.40c. for Shell, 1.50c. to 1.70c. for Flange, 2.10c. to 2.30c. for Fire Box, 3.50c. to 4c. for Locomotive Fire Box, on dock. Charcoal Iron Plates are held at 2.40c. for C. H. No. 1, 2.90c. for Flange, and 3.40c. for Fire Box. Refined Bars are 1.30c. to 1.35c.; Common Bars, 1.15c. to 1.35c.; Soft Steel Bars, 1.15c. to 1.30c., and Hoops, 2c. to 2.25c., base, on dock.

**Old Material.**—Offerings of Old Material in this market continue exceedingly heavy, and in some instances consumers themselves have tried and have succeeded in effecting resales. Old Steel Rails are offering at \$11 without takers. Export business to the Mediterranean is at a standstill, owing to high rates of freight, and \$10 alongside is the best which exporters will name for Old Steel Rails.

Alvin Beveridge and Adolph Pluemer, the latter connected for many years with the Iron trade of the West, have formed the Beveridge-Pluemer Company, as Iron and Steel merchants. They have an office at 10 Wall street.

George A. Enell, for 16 years connected with A. R. Whitney & Co., Iron merchants, has established himself in the Iron and Steel business, with offices at 29 Broadway.

Graphite, practically pure, we are informed, is being produced on a commercial scale by the Acheson Graphite & Pure Carbon Company of Niagara Falls, N. Y. The material cannot be distinguished by the eye from the natural product, but is much more harsh to the feel. Its success as a substitute for natural graphite in plumbago crucible making has, however, not yet been demonstrated.

## Metal Market.

Office of *The Iron Age*, 222-228 William street, New York, August 22, 1900.

**Pig Tin.**—The market has been entirely demoralized. Prices have been declining and consumers are very wary. During the week under review this market has declined fully 1½c. per lb., and even at the decline the demand is so small that sales can only be forced, and then at lower figures. At the close to-day the market was quoted 30.12½c. to 30.35c. for spot. August was offered at 30.25c., but the offer met with no purchasers. September was offered at 30c., but suffered a similar fate as there were no buyers. The decline comes through the break in London, where prices dropped £6 during the week, the heaviest break coming to-day. At the official close of the London exchange to-day the market was £2 5s. lower, closing at £138 for spot and £138 10s. for futures. Right after the close, however, prices declined to a greater extent, and we are informed by special cable that the decline amounted to £1 10s., the closing quotations being £136 10s. and £133.

**Copper.**—While the general conditions remain practically unchanged the metal is so strongly held that prices in this market have advanced. On Thursday last the official quotations given out by the Metal Exchange were raised ½c. per lb. to 16½c. for Lake and 16½c. for Electrolytic and Casting, but late on the same day the half monthly European statistics were published, having a dampening effect on the market. Visible supplies in Europe had increased to 3500 tons during the first two weeks of August. The European visible supply is now up to 32,490 tons, against 21,327 tons for February 1. This shows an increase of about 50 per cent. within six months. The visible supply in Europe is now larger than we have seen it at any time during one year. It is about the same as it was during the latter part of 1897, when prices in Europe ranged between £48 and £50. To-day the official quotations are 16½c. for Lake and 16½c. for Electrolytic. Many of the Metal merchants, however, claim that they will not sell below 16½c. Throughout the week the London market declined £1 2s. 6d., and closed weak to-day at £73 and £73 10s. Best Selected declined 5 shilling to £78 15s. Below we give a comparative statement showing the visible supply and London quotations extending back to August, 1897. The table was compiled by Henry R. Merton & Co. of London, we having added the figures for the first half of this year:

Month ending—	Stock in England and France and afloat thereto from Chile and Australia. Tons.	Price of G. M. B. and Standard Copper.	
		£	s.
* August 15, 1900.	32,490	74	2 6
July 31, 1900.	28,913	73	0 0
June 30, 1900.	29,263	71	15 0
May 31, 1900.	29,204	73	5 0
April 30, 1900.	27,475	76	15 0
March 31, 1900.	24,632	78	12 6
February 28, 1900.	22,982	74	15 0
January 31, 1900.	21,327	71	5 0
December 31, 1899.	22,817	70	0 0
November 30, 1899.	25,765	73	15 0
October 31, 1899.	26,804	72	17 6
September 30, 1899.	28,328	75	15 0
August 31, 1899.	32,389	76	15 0
July 31, 1899.	33,019	78	5 0
June 30, 1899.	29,004	76	15 0
May 31, 1899.	30,156	76	15 0
April 30, 1899.	26,529	77	0 0
March 31, 1899.	28,497	70	0 0
February 28, 1899.	24,326	71	0 0
January 31, 1899.	26,015	69	10 0
December 31, 1898.	27,896	57	10 0
November 30, 1898.	26,897	56	2 6
October 31, 1898.	25,798	54	15 0
September 30, 1898.	27,583	52	8 3
August 31, 1898.	28,397	51	15 0
July 31, 1898.	29,861	50	2 6
June 30, 1898.	28,101	49	15 0
May 31, 1898.	27,789	51	2 6
April 30, 1898.	28,891	52	2 6
March 31, 1898.	28,023	50	17 6
February 28, 1898.	29,262	50	10 0
January 31, 1898.	29,746	49	0 0
December 31, 1897.	31,955	48	5 0
November 30, 1897.	33,091	48	0 0
October 31, 1897.	34,389	47	15 0
September 30, 1897.	33,759	49	2 6
August 31, 1897.	33,267	49	2 6

\* Half month.

**Pig Lead.**—Is very quiet, and in some sections the situation is described as being very dull. The London market is said to be weak, and has declined 7 shillings 6 pence to £17 10s. The American Smelting & Refining Company are still quoting 4.25c. for 50-ton lots, New York delivery, and 4.20c. f.o.b. St. Louis.

**Spelter.**—Is weak. Sales are reported to have been made as low as 4.15c., and it is said that sellers can be found at that figure to-day. London is quoted £19 10s.

**Antimony.**—Is unchanged. Hallett's is quoted 9½c. and Cookson's 10½c.

## QUOTATIONS OF IRON STOCKS DURING THE WEEK ENDING AUGUST 22, 1900.

Cap'l Issued.		Sales.	Thursday.	Friday.	Saturday.	Monday.	Tuesday.	Wednesday.
\$20,000,000	Am. Car & Foundry, Common..	430	16 -16½	-15½	.....	.....	-15½	.....
20,000,000	Am. Car & Fly, Pref. (7 ½ Non-Cu.)	.....	20 -20½	19½-19½	.....	19½ 20	.....	19½-19½
12,000,000	Am. Steel Hoop, Common..	1,450	67½-67½	-67	.....	.....	.....	.....
14,000,000	Am. Steel Hoop, Pref. (7 ½ Cu.)..	650	34½-35½	34 -34½	35 -35½	34½-35½	35½-35½	35½-35½
50,000,000	Am. S. & W., Common..	26,115	26½-27	25½-26½	25½-26	25½-26	25½-26	25½-26
40,000,000	Am. S. & W., Pref. (7 ½ Cu.)..	1,920	75½	75	.....	74½-75	74½-75	74½-75
28,000,000	Am. Tin Plate, Common, N. Y....	4,540	26½-27	25½-26½	.....	25½-26½	25½-26½	25½-26½
18,325,000	Am. Tin Plate, Pref., N. Y. (7 ½ Cu.)	200	.....	.....	.....	.....	-78	-78
7,500,000	Bethlehem Iron†.	269	-57	.....	.....	-57	.....	.....
15,000,000	Beth. Steel, Par \$50, \$1 paid in...	301	.....	14½-15	.....	-14½	.....	.....
7,974,550	Cambria Iron, Phila*.	30	.....	-45	.....	-45	.....	.....
16,000,000	Cambria Steel **.	2,975	163½-163½	163½-163½	163½-163½	163½-163½	163½-163½	163½-163½
11,000,000	Col. Fuel and Iron.	1,700	35½-35½	35 -35½	.....	34½-35½	35 -35½	34½-35½
46,484,800	Federal Steel, Common..	17,647	34½-35½	33½-34½	34½-34½	33½-34½	34½-34½	34½-34½
53,253,500	Federal Steel, Pref. (6 ½ Non-Cu.)	1,449	66½-67½	-66½	-66½	66½-67	66½-67	66½-67
32,000,000	National Steel, Common, N. Y....	2,600	26½-27	26½-27	.....	25½-26½	25½-25½	25½-25½
27,000,000	Nat'l Steel, Pref., N. Y. (7 ½ Cu.)	700	.....	84½-85½	.....	.....	.....	.....
40,000,000	National Stl. Tube, Common, N. Y	5,017	46½-47½	46½-46½	43½-46½	46 -46½	-46½	-46½
40,000,000	National Stl. Tube, Pref., N. Y...	3,807	92½-92½	-92½	92½-92½	92½-92½	-92½	92½-92½
5,000,000	Penna., Common, Phila..	.....	.....	.....	.....	.....	.....	.....
1,500,000	Penna., Pref., Phila..	.....	.....	.....	.....	.....	.....	.....
12,500,000	Pressed Steel, Common..	1,830	40½-40½	40 -40½	40½-40½	-40	39½-40	39½-39½
12,500,000	Pressed Steel, Pref. (7 ½ Non-Cu.)	910	-72½	72 -72½	-72½	.....	71½-72	71½-72
27,832,000	Republic Iron & Steel, Common..	2,466	11½-12	10½-11½	.....	-11½	.....	11½-12½
20,832,000	Repub. Iron & Steel, Pref. (7 ½ Cu.)	765	-53½	-58	.....	-54	.....	.....
7,500,000	Sloss-Sheffield S. & I., Common..	100	-19½	.....	.....	.....	.....	.....
6,700,000	Sloss-Sheffield S. & I., Pref..	200	-66½	.....	.....	.....	.....	.....
20,000,000	Tennessee Coal and Iron..	6,086	70½-71½	69½-71	-70	70 -70½	69½-70	69½-69½
1,500,000	Warwick Iron & Steel (par \$10)..	929	-7½	.....	.....	-8	-8	.....

\* Par \$50. \*\* \$9 per share paid in. † 6% guaranteed by Beth. Steel Co. Late Philadelphia sales by telegraph. ‡ Ex-dividend.

**Bonded indebtedness:** Am. S. & W., \$190,656; Am. Tin Plate, none; Am. Steel Hoop, none; Cambria Iron Co., \$2,000,000 6 ½ debenture 20 year bonds, 1917, payable option 5 years, assumed by Cambria Steel Co.; Federal Steel Co., \$9,822,000 Illinois 5 ½, \$7,417,000 E. J. E. R. R. 5 ½, \$1,000,000 Johnson 6 ½, \$6,732,000 D. & I. R. R. 5 ½, \$1,000,000 2d D. & I. R. R. 6 ½, \$10,000 land grant D. & I. R. R. 5 ½; National Steel, \$2,561,000 6 ½; National Tube, none; Tennessee C. I. & R. R. Co., \$8,367,000 6 ½, \$1,114,000 7 ½, \$1,000,000 7 ½ cu. pref.; Pennsylvania Steel, \$1,000,000 5 ½, Steelton, 1st, 1917, \$2,000,000 5 ½; Sparrow's Point, 1st, 1922, \$4,000,000, consolidated, both plants; Bethlehem Iron, \$1,351,000 5 ½ maturing 1907. Interest and principal guaranteed by Bethlehem Steel Co. Republic Iron & Steel, none; Colorado Fuel & Iron Co.; Col. Fuel Co. Gen. Mort. 6 ½ \$880,000, Col. Coal & Iron Co. Mort. 6 ½ \$2,810,000, Col. Fuel & Iron Gen. Mort. 5 ½ \$2,303,000. Also outstanding \$2,000,000 preferred stock with accumulated dividends of \$640,000 to June 30, 1899.

**Nickel**—Continues strong and unchanged. It is impossible to obtain large lots and small quantities are bringing from 55c. to 60c.

**Quicksilver.**—Wholesale lots of 50 flasks and more are quoted \$51 per flask of 76½ lbs. London is quoted £9 5s. to-day.

**Tin Plate.**—The American Tin Plate Company announce that they have not changed their prices, and are still quoting on a basis of \$4.84 per box of Standard 100-lb. Cokes, f.o.b. New York, or \$4.65 f.o.b. mill. In England there has been a decline, and prices are now down to 14 shillings 6 pence. It is said that there is a fear of an importation of certain sizes on this account, and it is stated that on the sizes in question prices are being cut. Regarding the settlement of the wage scale we are informed that an agreement has practically been reached between the American Tin Plate Company and the committee representing the Amalgamated Association. The committeemen were not willing to close the matter, however, and have gone back to their respective cities to receive the sanction of the lodges before they act. It is hoped that this matter will be brought to a close speedily, and the men return to work early in September. The American Tin Plate Company are turning away considerable work, owing to the fact that their stocks are exhausted in certain sizes.

John Stanton reports the Copper production in the United States and of the foreign reporting mines and United States exports as follows, in gross tons of 2240 lbs.:

Reporting	Outside	Total U. S.	Product	U. S.
mines.	sources	foreign	mines.	exports.
First half 1895...	70,612	9,100	79,712	42,484 34,215
Second half 1895...	84,885	6,000	91,485	45,674 30,507
Total 1895...	155,497	15,700	171,197	86,178 64,722
First half 1896...	94,180	7,200	101,380	42,265 58,216
Second half 1896...	95,314	7,200	102,514	43,941 67,287
Total 1896...	199,494	14,400	203,894	86,196 125,503
First half 1897...	103,651	5,000	108,651	44,263 64,870
Second half 1897...	100,555	6,900	107,455	44,007 64,346
Total 1897...	204,206	11,900	216,106	88,270 129,210
First half 1898...	112,687	7,800	120,457	40,860 68,284
Second half 1898...	103,585	10,250	113,785	43,674 76,881
Total 1898...	216,222	18,050	224,272	84,554 145,115
First half 1899...	111,967	12,500	124,487	43,629 56,460
Second half 1899...	118,818	18,900	137,719	45,611 63,351
Total 1899...	230,806	31,400	232,206	89,240 119,811
First half 1900...	114,177	20,400	134,577	43,183 90,747
July, 1900...	19,612	3,400	23,012	7,443 11,636

Each summer excursions on a gigantic scale are organized for their employees by the great English screw making corporation, Nettlefolds, Limited, of Smethwick. This year the usual excursions set out on Friday, August 3, in 15 specially chartered trains, which conveyed about 12,000 persons to London, the West of England, Liverpool, the Isle of Man, Blackpool and various places in North Wales. Special tickets were issued at cheap rates

to enable the men in the employ of the company, with their families, to spend a week's holiday at the resort of their own selection, the company paying a considerable sum toward the expense of the outing.

## Iron and Industrial Stocks.

The steel stocks exhibited less animation the past week, reflecting the lack of interest now being taken in general stock speculation. Steel and Wire and Federal Steel were the leaders in volume of business, but showed a narrow range of fluctuations. The Moore stocks did not sustain the upward movement which characterized them the previous week. The tube stocks and Tennessee Coal have been conspicuous for their strength.

	Bid.	Asked.
American Bicycle Company, common.	6	6 ½
American Bicycle Company, preferred.	30	32
American Bicycle Company, bonds.	..	80
E. W. Bliss, common.	125	137 ½
E. W. Bliss, preferred.	75	80
Cramp's Shipyard stock.	3 ½	3 ½
Diamond State Steel.	4	4 ½
International Silver, common.	18 ½	20
International Pump, common.	65 ½	66 ½
International Pump, preferred.	28 ½	29 ½
Otis Elevator, common.	86 ½	87 ½
Pratt & Whitney, common.	3 ½	5
Pratt & Whitney, preferred.	50	55
U. S. Projectile.	95	100
Tidewater Steel.	8	8 ½
U. S. Cast Iron Pipe Company, common.	3 ½	4 ½
U. S. Cast Iron Pipe Company, preferred.	32 ½	34
H. R. Worthington, preferred.	110	110
Empire Steel, common.	6	10
Empire Steel, preferred.	30	36

The American Bicycle Company will offer to their stockholders rights to subscribe for 11,500 shares of Rubber Goods Mfg. Company preferred and 23,000 common. The price for one share of preferred and two of common is \$140, being 80 and 30 respectively, but the shares will not be sold separately. Subscriptions must be accompanied by 10 per cent. of the amount. The rest is payable on allotment. The company received this stock in payment for rubber plants sold a year ago. The market prices of the stocks are about 3 per cent. below the figures offered for subscription.

The National Tube Company have declared the regular quarterly dividend of 1 ½ per cent. on the preferred stock, payable October 1. Books close September 13, and reopen October 2.

The Park Steel Company have declared the regular quarterly dividend of 1 ½ per cent. on their preferred stock, payable September 1. Books closed August 20, and reopen September 1.

The Barney & Smith Car Company of Dayton, Ohio, have declared a dividend of 2 per cent. on their preferred stock, payable September 1.

### The Pressed Steel Car Company.

The two large plants of the Pressed Steel Car Company, in Allegheny and McKee's Rocks, Pittsburgh, are busy and have a large amount of work ahead. Large additions are being made to the plants in lower Allegheny and at McKee's Rocks for the production of wooden cars with steel under frames. An additional building is going up at McKee's Rocks, the construction being the work of the Riter-Conley Mfg. Company. In Allegheny the building formerly used by the Baker Chain & Wagon Iron Mfg. Company has been cleared of its old equipment and suitable planing mill machinery installed for the production of steel cars. The improvements for the introduction of the departure in the industry are costing upward of \$200,000. At McKee's Rocks a building 140 feet wide and 500 feet long is being built for this purpose. Half of this building, toward the Ohio River, is to be used for a planing mill, and the other half for erecting the cars. There will be eight tracks in the end in which the cars are to be built, on which can be erected 64 cars. The planing mill proper will be equipped with the latest and most modern machinery for getting out the material, and will have a capacity of 65 cars per day. The cars to be built in this building will not be made entirely of wood, but will have steel under frames and wooden superstructure. The steel under framing will be put together and riveted in the present erecting shop at McKee's Rocks and will be trucked after this part of the car is finished, and then taken to the wooden car shop, where the superstructure will be placed on it, and where the air brakes, painting and final inspecting will be done. At the same time the building of steel cars in their entirety will be going along in the present erecting shop, making the daily output 100 cars or more.

The Pressed Steel Car Company last week made a shipment of 100 cars for the Paris, Lyons & Mediterranean Railroad of France. The cars were sent out of Pittsburgh in two trains of 50 cars each. The cars are 39 feet 1 inch in length, 9 feet wide and 8 feet high. The construction of the car body is very similar to that of the flat bottom gondolas in use in this country, excepting that at the middle of each side of the car double doors are placed which open outward. These doors were necessitated in the shipment of casks of wine. When loaded and unloaded the doors are opened and the casks rolled in or out. The Pressed Steel Car Company have also received an order for the trucks and truck bolsters for 2000 new freight cars for the Seaboard Air Line. The cars will be made by the South Baltimore Car Works.

### The East River Bridge Injunction.

Through Kellogg & Rose, attorneys, of 120 Broadway, New York, Julius Meyers has served an injunction on the new East River Bridge Commission, enjoining and restraining them from awarding or entering into contract for the work of building the approaches on the Manhattan and Brooklyn terminals of the new East River Bridge. The matter will come up for argument at 10.30 on Thursday morning, August 23, before the Supreme Court, Special Term, Part 1.

The plaintiff holds that the proposed contract and specifications and the advertisement for bids and proposals for the execution of this work were fraudulently prepared and issued. His contention is that they were issued with the purpose and intent of limiting competition, and confining the same to a small class of bidders. There are three clauses in the contract to which the plaintiff takes exception.

The first is that "As by form the greater part of this work can be executed only by bridge establishments of the first class, bids will be received only from such parties as have the requisite plant and facilities which have been in successful operation on work of similar character for at least one year." The plaintiff claims that, although competent and reliable bidders with the requisite plant and facilities desired to submit bids and proposals for the doing of said work, they were prevented from so doing unless their plant and facilities had been in successful operation on work for at least one year.

The second section of the contract to which the plaintiff takes exception is regarding the labor law, the contract calling on the contractor to comply with the provisions of chapter 415 of the laws of 1897. This law provides that the contractor shall give residents of the State of New York preference, stipulates the wage scale and fixes an eight-hour day. This law is held by the plaintiff to be unconstitutional. It is now pending decision before the Appellate Division of the Supreme Court.

The third and most important objection of the plaintiff is regarding the specifications for the quality of

steel to be furnished. The specifications in the contract provide as follows:

"The finished steel shall not contain to exceed the following limit of the elements named: Phosphorus, 0.06; sulphur, 0.04; manganese, 0.80, and silicon, 0.35."

The plaintiff holds that these specifications prohibit the furnishing of the steel by any other company than the Carbon Steel Company, whose steel alone meets the requirements and conditions of the contract, although steel manufactured by other companies than the Carbon Steel Company is equally good and well adapted for the purpose.

Regarding this matter a member of the commission said to-day: "We deny the charge that the specifications were gotten up with a view of restricting competition. We are simply after the very best steel obtainable for the purpose. There are at least four concerns in this country who are producing the grade of steel specified, and it can be produced by any of the large steel companies if they choose to make it. We are desirous of getting our material from a concern who are reliable and can be depended upon, and consequently we inserted the clause regarding the experience required by the bidders. As to the labor law, that is now before the Court and as it is a law we must comply with it."

Bassett W. Mitchell submitted an affidavit confirming the charges of Mr. Meyers. Mr. Mitchell is the general manager of the Hydraulic Construction Company of 1 Broadway, New York. This company were among the bidders for the work. A list of the bidders and the amounts of the bids were printed in *The Iron Age* under the date of August 16, page 17.

The Landis Tool Company of Waynesboro, Pa., are putting up a new foundry building, 80 x 64; also other buildings contiguous for cupola house, casting cleaning room and washroom for the men, the whole area covered being 100 x 80 feet. The works have during this year up to the present time had pressure of orders beyond their capacity, and now have on hand what keeps them fully engaged. Among orders filled within a short time may be mentioned one No. 3 universal grinding machine to John A. Roebling's Sons Company, Trenton, N. J.; one No. 4 to the Hyatt Rolling Bearing Company, Harrison, N. J.; one No. 5 to the New York Navy Yard, Brooklyn, N. Y.; one No. 1 to the Shaw Pneumatic Tool Company, Denver, Col.; two No. 1 to the London agent of the company, London, England, and two No. 2 to Berlin agents, Berlin, Germany.

The I-X-L Steel Overshoot Water Wheel Company of Hanover, Pa., have contracted to build a water wheel for W. R. Tebe, Smyrna, Mich.; Ruggles Machine Company, Poultney, Vt.; J. R. Daniels, Buffalo, Ala.; George Squires Mfg. Company, New York; R. N. Simms, Powelton, Va.; E. Davis, Hillsboro, Md., and several others. The material used in the construction of their wheels is flat bar and sheet steel. The works are now so overcrowded with work that it has been resolved to make an addition to them next spring.

The Frick Company of Waynesboro, Pa., have contracted to build a 24 x 48 x 80 compound Corliss engine for the Pittsburgh Plate Glass Company, Pittsburgh, Pa.; a 24 x 48 Corliss engine for Monterey, Mexico, and a 30 x 36 x 42 compound Corliss engine for the Chambersburg Electric Light Company, Chambersburg, Pa. They are also building a number of small Corliss engines for various firms, and manufacturing a 10-ton plate ice making plant for the Hilo Power & Electric Company, Hilo, Sandwich Islands.

The Geiser Mfg. Company, Waynesboro, Pa., are erecting a boiler shop 200 x 100, to be fitted up with all the latest improved machinery in their line. It is expected to be completed ready for operation by November 1. The building of this shop was an absolute necessity, owing to the great increase in their trade. Their principal manufacture is traction, portable and stationary engines and boilers, threshers and saw mills.

A majority interest in the Cuban Steel Ore Company of Philadelphia, Pa., represented by Evans R. Dick, W. W. Gibbs, George S. Graham, Luther S. Bent and Edgar C. Felton, are forming a voting trust of the company's capital stock. Stockholders are invited to deposit their stock with the Girard Trust Company, who will issue certificates of beneficial interest, the voting power of the stock being lodged with Evans R. Dick, Edgar C. Felton and Henry Tatnall. The right to deposit will expire on September 15, 1900, after which stock will only be received under such terms as the voting trustees may elect.

The Ocean Coal Company have commenced the building of 1000 coke ovens near Herminie, Westmoreland County, Pa. The Hempfield branch of the Pennsylvania Railroad is being extended to this field.

## The New York Machinery Market.

Office of *The Iron Age*, 222-228 William street.  
NEW YORK, August 23, 1900.

Very little can be said about the general condition of the market. It is quiet but not unusually so when the season of the year is considered. It has been a typical August week. The underlying indications of a good fall trade have not diminished, and enough business was transacted to repay the efforts of such merchants as remained in town. As far as we can ascertain there have been no changes in prices. There are signs of a good fall trade from foreign fields. Inquiry in all lines was good. The machine tool trade are doubtless experiencing the least activity of any branches represented in the machinery district.

There are, however, a number of items which have kept up interest in that section. The number of projects requiring a good quantity of machine tools which have recently come up are said to afford a most encouraging outlook.

A fair sized contract was closed during the week under review. The order was awarded to the Prentiss Tool & Supply Company by a large Western Pennsylvania concern. Besides a number of small sized ordinary tools, the work included a 60-inch and a 12-foot boring mill, two large radial drills, several upright drill presses, two 38-inch lathes, two 26-inch planers and a heavy slotter.

The equipment for the extension which has just been made to the plant of the E. W. Bliss Company, at Brooklyn, has been purchased. After a sharp struggle and some very warm competition it went to Manning, Maxwell & Moore. The equipment is said to be valued at about \$20,000.

Another adjournment of the meeting of the stockholders places the final consummation of the Pratt & Whitney-Niles-Bement-Pond transaction still further into the future. The meeting, which was held at Hartford last Thursday, was adjourned until September 20. It is explained that the failure to close the deal was not due to any opposition on the part of the stockholders, but is simply caused by the fact that certain stockholders are very dilatory about sending in their stock. At the first meeting of the stockholders, which was held several weeks ago, 16,910 shares of the stock were turned in. The meeting of last week increased this amount to 22,278 shares, but this is insufficient to close the deal, as it will be necessary to gather in all of the stock, which consists of 27,500 shares. A little difficulty is being experienced in tracing some of the stock, and a number of the stockholders are now abroad. In addition to the shares thus far pledged many certificates are known to be on the way. It is expected that all of the stock can be accounted for by the next meeting on September 20.

The Franklin Air Compressor Company have again been in this market purchasing for the fitting out of their new plant at Franklin, Pa. Besides a good sized lot of the smaller sizes of machine tools, they purchased a 300 horse-power Brown engine from Woolston & Brew of 141 Broadway. They also purchased four 200 horse-power boilers from the Pennsylvania Boiler Works of Erie, Pa., and a system of rope drives from George V. Cresson of 141 Liberty street. From Chisholm & Moore of Cleveland they purchased one 20-ton and one 10-ton pneumatic crane. They are still in the market for a quantity of machine tools.

The International Steam Pump Company have been shopping about with a list of tools, the most of which were special. We have not heard that they have purchased as yet.

An addition is being built to the projectile plant of the Benjamin Atha & Illingworth Steel Company of Harrison, N. J. The original plant, it will be recalled, was equipped slightly more than a year ago with an excellent lot of tools. The company are now members of the Crucible Steel Company of America. They have made numerous recent additions to the plant.

There is a little gossip in the street to the effect that a New York syndicate are preparing to build a modern shipbuilding plant at Pensacola, Fla. We have been unable to obtain any confirmation.

The Goulds Mfg. Company of Seneca Falls, N. Y., are now equipping the new buildings which they have recently added to their plant. The new section of the plant is to be used in the building of heavy power pumps of any capacity. A brass and iron foundry will also be erected, as will a testing department, at which it will be possible to secure 150 horse-power at a moment's notice. The heavy pump business is a new departure for this company. It is expected that the new plant will be ready for operation in about three months.

It is reported in the trade that overtures are being made by the Kingsford Boiler Works of Oswego, N. Y., toward the rebuilding of their plant, which was recently destroyed by fire. The loss sustained through the fire

was \$100,000, and it is said that the new plans contemplate a larger plant than the one which was destroyed.

At Arlington, N. J., the Arlington Copper Company have been reopening the old copper mine, formerly known as the Belleville Copper Mine, which was abandoned in 1863, after having been operated for over 100 years. The new company have given out contracts for the construction of an electrolytic reduction plant, and are now in the market for other materials. They will purchase materials for the erection and equipment of a mill, roaster and power house.

We are informed that the Birmingham Cement Company have arrived at an adjustment with the insurance companies regarding their plant, which was almost entirely destroyed by fire a few weeks ago. The plant was located at Ensley, Ala. A new plant will be erected as soon as possible, having a capacity of 1000 barrels. T. R. Baldwin, president of the company; J. D. Cheever, treasurer, and John L. Gibbon, vice-president and superintendent, are now in this city. They are making their headquarters at the offices of H. W. Poor & Co., 18 Wall street. Mr. Gibbon is purchasing the machinery and material required in the rebuilding of the works. As previously stated in this column this company produce Portland cement from the slag of the furnaces of the Tennessee Coal & Iron Company.

A 1000 horse-power power plant is being purchased by the Nairn Linoleum Company of Arlington, N. J. They have contracted with the Fuel Economizer Company of 74 Cortlandt street for a system of Green's fuel economizers.

A new plant is being erected at Jones Point, near Haverstraw, N. Y., by the Rockland Cement Company. The Ruggles & Coles Engineering Company of 39 Cortlandt street are the designing and constructing engineers. They will purchase the equipment.

C. I. Roskoph & Co., experts in blow piping and ventilating, of 50 New street, have just completed an interesting exhaust fan plant at the works of R. Hoe & Co., 504 Grand street, New York. The work consists of a system for the removing of dust and chips from the grinding room of the saw department. But one blower is used for the relief of 49 special design emery wheels. With the exception of a hood, which partially surrounds each grinding machine and a short section of pipe which leads to the main duct, the entire apparatus is concealed from view. The work was rendered especially difficult, owing to the weight of the chips which it was necessary to remove and the limited space which the grinding room afforded.

The Passaic Print Works of Passaic, N. J., have just awarded contracts for the building of a filtration plant. They have given an order to H. C. Maxfield of 39 Cortlandt street, who is the New York representative of the Lawrence Machine Company, for six 10-inch double suction centrifugal pumps. They will have a total capacity of 12,000 gallons per minute, and each will be driven by a 20 horse-power electric motor.

The New York Light, Heat & Power Company, who are building a new power station on Thirty-eighth street and East River, have purchased a 50-ton three-motor electric traveling crane from A. A. de Bonneville, the New York representative of Pawling & Harnischfeger. The crane will be of 100 feet span, and will be the largest electric traveling crane ever installed on Manhattan Island. Mr. de Bonneville also sold this company six 10-ton hand travelers, which will be distributed among their various substations. Among other work just taken at the New York office of Pawling & Harnischfeger are two electric travelers for the Cooke Locomotive & Machine Works of Paterson, N. J., one of which will be a 30-ton, with two 15-ton trolleys and the other a 10-ton. They have also sold the East Jersey Pipe Company of Paterson a 10-ton electric with two trolleys and the C. Pardee Works of Perth Amboy, N. J., a 5-ton three-motor electric. The New York offices of Pawling and Harnischfeger are located at 11 Broadway.

The Clonbrook Steam Boiler Company of Brooklyn have received an order from the Tube Steel Company for 16 500 horse-power Marvin Climax boilers. They are to be erected in the new plant which the latter company are erecting at Benwood, W. Va.

The Ryan-McDonald Mfg. Company of Baltimore report an excellent business at their New York office, 11 Broadway. They have just closed contracts for 100 standard gauge cars for the Tehuantepec Railroad, which connects Coatzacoalcos with Salina Cruz, Mexico. They have also sold 50 standard gauge cars to S. Pierson & Sons for the construction of the Salina Cruz wharf. This contract is valued at \$90,000. To Miguel Diaz of Cardenas, Cuba, they have sold 50 standard gauge sugar cane cars, and they are shipping 50 cars to the contracting firm of Lathrop, Shea & Henwood. These will be used at the new plant which the Lackawanna Iron & Steel Company are erecting at Buffalo, N. Y. Through Arthur Koppel of 68 Broad street they have received a

\$12,000 order for cars, which are to be shipped into Northern Germany. The German firm find that they can purchase cars in this country at a lower cost than is required for building them at their own plant at Berlin.

We are informed that the Pabst Brewing Company of Milwaukee are erecting a \$100,000 ice and refrigerating plant at Havana, Cuba.

## The Philadelphia Machinery Market.

Office of *The Iron Age*, Forrest Building, Philadelphia, Pa., August 20, 1900.

The general tone of the machinery market is rather quiet, although many of the members of the various firms are absent on vacations, making it difficult to learn just what is going on. There is one fact most evident, however, and that is, there is very little business being booked at present. This does not necessarily imply that shops are dull. On the contrary, they are working right along, in a majority of cases on full time. The rather aged explanation of "previous bookings" readily accounts for the matter. There is but little doubt that many orders are being held back until buyers are able to learn "what's what." With the declining price of iron, prospective buyers seem to think it better to wait awhile before placing orders, with the hope of securing lower prices on finished products.

A number of the foremost houses, when asked as to their opinion of the general situation, replied that a general strengthening of the market can hardly be expected until well into the fall and after the excitement incident to the election is over. There seems to be no uneasiness in regard to the future of the trade, the general opinion being that while nothing like the rush of 1899-1900 is to be expected, yet a fair and withal satisfactory condition of trade is in prospect. Some one or two manufacturers, who rarely see any but the dark side, complain about slack times, but the activity in their own shops is evidence that the fall off from a year ago is not so badly felt as they say.

W. S. Shipley, Bourse Building, reports the sale of a large planer, a number of quick change gear lathes, and a considerable quantity of the Reeves variable speed counter shafts. Mr. Shipley states that the general trade is quiet.

Israel H. Johnson, Jr., & Co. say that business for July and thus far in August exceeds all previous bookings for same period. This concern's new shop is now ready for the installation of the necessary tools and machines. It is expected to install the 20-ton crane within a few days. A large planer made by Wm. Sellers & Co., Incorporated, is also to be shortly placed in position. Among recent bookings Johnson & Co. report 12 lathes for the New York Ship Building Company, Gloucester, N. J., and projectile turning and boring lathes for Taylor Iron & Steel Company of High Bridge, N. J. Orders are also on hand for a number of exceptionally large lathes, one to be 100 feet long, weighing 230,000 pounds, while another will weigh 180,000 pounds.

The American Pulley Company are now entirely settled in their new location at Twenty-ninth and Bristol streets, Nicetown, where, with quarters several times as large as their former plant, they are in a position to greatly increase their output. With the exception of the machinery for manufacturing the extremely large sized pulleys, their plant is in complete working order. The company have considerable work in hand, and report a satisfactory condition of trade for this season of the year.

The shops of Thos. Dallett & Co. are busy, a good volume of trade, especially on machines for special uses, being reported. The various pneumatic tools made by this concern are in good demand, as are their flexible shaft tools. Foreign inquiries are fair.

Geo. V. Cresson & Co. are running along in good shape, the demand for their various products keeping up very well. They make no mention of any specific shipments other than a considerable number of small lots are being constantly forwarded to various points.

The Otto Gas Engine Company are more rushed with orders than ever before in their history, this being the state of affairs for the past 18 months, with every prospect of a continuance of same for a long while to come. The company have just received an order from the Holland Torpedo Boat Company for six 180 horse-power gasoline engines, marine type, to be installed in submarine torpedo boats being built by the Holland Company for the United States Government.

Chambers Bros. Company report a steady demand for their products, although trade has fallen off somewhat during July and August. This company make a specialty of brick making machines, and state the sales are very good.

The Keystone Drop Forge Company are busy. A large order for tent pins for the United States Government has recently been booked. This concern also report a number of orders for forgings for automobile parts, and say this branch of their trade is growing to a considerable extent.

The Philadelphia Pneumatic Tool Company report a constantly growing trade, and say that each month's business exceeds that of the previous month. The Maryland Steel Company have just placed an order for a number of pneumatic hand rammers for ramming converter bottoms in their Bessemer plant. A new riveting hammer for driving rivets up to 1 1/4 inch diameter has just been placed on the market by the company, and which has been very favorably received, more than twice the number being ordered as was made up in the first lot manufactured. This house report their general trade as excellent, there being a large foreign demand for their products, especially from Germany.

J. W. Paxson & Co. say that August of this year has been a wonder, the volume of trade being surprising, considering the time of year. Inquiries are numerous and business in all their lines is brisk.

Alfred Box & Co. make no mention of shipments other than that they are making rapid progress with work in hand, and are making satisfactory deliveries. General trade is very active with this firm.

Morse, Williams & Co. report two particularly large contracts for the month of August—one from the Union Passenger Station at Pittsburgh, consisting of five hydraulic passenger elevators, ten hydraulic passenger and freight elevators and six hydraulic freight elevators of the plunger type. Another large contract has been received from the Terminal Station, Chesapeake & Ohio Railroad, for two hydraulic passenger and ten hydraulic freight elevators.

The Energy Elevator Company have as much work on hand as they can attend to. Besides a considerable number of orders for freight lifts from Southern sugar refineries, they have a big local demand for their goods. This house have just issued an illustrated catalogue of their various lines, showing dimensions, weights, prices, &c., of the various patterns of lifts.

The Baldwin Locomotive Works recently booked an order from the Louisville & Nashville Railroad Company for ten consolidation engines, an order for 27 engines for the Union Pacific Railway, and an order for ten wheeled Vauclain compound passenger engines for the Big Four. The works will shortly begin shipment of 15 passenger locomotives for the Seaboard Air Line. Two locomotives equipped with the Vanderbilt patent fire box were recently delivered to the Baltimore & Ohio Railroad Company, and are making a very satisfactory record.

The Neafie & Levy Shipbuilding Company have secured a contract to build a large twin screw steamship for Boulton, Bliss & Dallett of the Red D. Line of New York. The new vessel is to be 277 feet long, 37 feet wide, and is expected to travel between New York and South American ports. The cost of the vessel will be about \$250,000. The Neafie & Levy Company are busy in all departments, having more boats in hand than ever before.

Wm. Cramp & Sons Ship & Engine Building Company are now employing about 7000 men in their various yards, the largest number they ever had on their pay roll.

The Hilles & Jones Company, Wilmington, Del., are well filled with work, besides which they report a considerable number of inquiries, especially from abroad. They are now shipping punching and shearing machines, straightening rolls, angle shears and general shop tools to the Wm. R. Trigg Company's ship yard, Richmond, Va. A pair of large bending rolls are now being made for the same concern. A large punching machine will go forward shortly for a Mexican house.

At the crane department of the Niles-Bement-Pond Company, Mifflin and Meadow streets, a number of improvements to buildings and equipment of plant may be noted. A brick girder shop, 400 x 50 feet, has been erected and equipped with two 15-ton electric cranes of their own design, having electric and mechanical brakes of a special design. These cranes have a sweep of the entire shop. Bending rolls, punches, angle shears, bulldozers, straightening rolls, saws for I beams and angles, &c., are also conveniently placed. Portable pneumatic piston riveters and punches of the Niles-Bement-Pond Company's own design and especially adapted for the work on which they are used are features of this department.

A new machine shop, 200 x 50 feet, is now in the

course of erection on the ground occupied by the present one, and later will be extended 110 feet. The roof is to be raised to 28 feet under the girders to enable the installation of a new 15-ton crane to facilitate the work of this department. The machine shop at present is equipped with tools not quite satisfactory for the nature of the work to be done and it is intended to supplant these with more suitable machinery, such as horizontal borers, gear cutters, small boring machines, hydraulic presses for pressing on wheels, &c. An erecting shop is also to be built, covering 310 x 55 feet. This will also have an equipment of two 15-ton electric cranes.

These improvements, when completed, will make available a ground floor area of 62,000 square feet, and will enable the present output of the plant to be doubled. The crane department have now on order and in course of construction 42 electric cranes, 37 of the single type and five of the double type, the capacity of these varying from 5 to 120 tons. Ten cranes are under construction for the New York Ship Building Company and two for the United States Government, both these being especially designed; one, of 60 tons capacity, is for the Brooklyn Navy Yard and is constructed with four trucks, each having an independent bearing specially devised to take up the strain and avoid rocking of girders. The other, a 40-ton crane, is entirely of steel, designed so as to have trolley and working parts hang below the girders, in order to give head room and also to enable the parts to be more accessible in case of repairs. Low speed motors are preferred in construction of these cranes because of the greater range of lift, although motors of any design may be used to suit the nature of the work the crane may be intended to be used for. Business with the crane department has been very good and prospects of large increase are excellent.

### The Wage Scales.

The meetings of Conference Committees of the Amalgamated Association and Republic Iron & Steel Company and American Steel Hoop Company, at Detroit, Mich., last week, were without success. Several lengthy sessions were held, and the situation was gone over very carefully, the manufacturers explaining through their representative, James H. Nutt, why it was impossible to pay the scale demanded by the Amalgamated Association. The fact was pointed out that prices of steel bars have recently gone below 1 cent a pound, and that a very large tonnage has been entered at prices ranging all the way from 90 cents up to \$1.05 and \$1.10. Prices of bar iron are correspondingly low, and the manufacturers insist that it is absolutely impossible, in the face of present conditions, to pay the high scale of wages in the new Amalgamated scale. The conference adjourned with the understanding that a vote will be taken in the lodges of the Amalgamated Association to give the Wage Committee discretionary power to change the scale. Until this is done, there will be no further conferences. When all the lodges have voted and the result is known, another meeting will be held in Detroit between the Conference Committees of the Amalgamated Association and the American Steel Hoop Company and Republic Iron & Steel Company.

In regard to the failure to effect a settlement of the tin plate scale, it can be stated that the only trouble in this scale is in some of the foot notes, and as it is of a minor nature, it is probable that the scale will be settled within a short time. This scale can be fixed up and the tin mills started without affecting in any way the puddling and bar mill scales.

**The Brown Hoisting Machinery Company.**—The Brown Hoisting Machinery Company, lately incorporated in Delaware, are intended to take the place of the Brown Hoisting & Conveying Machine Company and continue the business without any interruption or practical change in management or methods. The new company will have an authorized capital stock of \$2,000,000, of which \$1,000,000 may be 7 per cent. non-cumulative preferred. The preferred stock will be issued for cash at par. The common stock will be issued in payment for all the property and assets of the present company, subject to their indebtedness. The total amount of common stock thus issued will be less than the net value of assets turned over. The new corporation will, therefore, start with a surplus of assets. The increase of cash capital was made necessary by the rapid and large increase in the amount of orders for the products of the company. The present company are an Ohio corporation. Ohio laws prohibit the payment of more than 6 per cent. dividends on preferred stock. It was, therefore, necessary to incorporate a new company under the

laws of another State in order to issue 7 per cent. stock for the additional capital needed.

### PERSONAL.

W. D. Matheson, superintendent of the National Tube Company's plant at Youngstown, Ohio, has been appointed superintendent of the company's works at Mid-dletown, Pa.

George A. Craigin has been appointed assistant general sales agent of the American Steel & Wire Company, to succeed George H. Ismon, transferred to the charge of the company's office at San Francisco. Mr. Craigin was for many years with the Washburn & Moen Mfg. Company, and has lately had charge of the manufacturers' department of the American Steel & Wire Company.

Press cables announce that John W. Gates is to sail for this country at an early date.

C. J. Maloney, superintendent of the wire nail department of the Kelly Nail & Iron Company, Ironton, Ohio, has resigned to accept a similar position on September 1 with the Belfont Iron Works Company of Ironton. Fred. Hunter has succeeded him at the Kelly works.

Among the passengers on the "St. Louis" last week was Frederic W. Gardner of Chicago, Western manager of the Michigan Stove Company, who has been expert in the Department of Liberal Arts and Chemical Industries at the Paris Exposition.

At the annual meeting of the stockholders of the National Tube Company the retiring Board of Directors was re-elected with the exception that J. R. De Laner and John D. Culbertson were chosen in place of Jonathan Rowland and O. C. Barber.

E. B. Thomasson has resigned as Southern sales manager for the United States Cast Iron Pipe & Foundry Company at Chattanooga, Tenn.

John E. Ware has resigned his position as secretary and treasurer of the Jenifer Furnace Company, Jenifer, Ala.

F. W. Pillsbury, for a number of years manager of the Fred. W. Wolf Company at Chicago, has resigned and has been appointed Western manager for the York Mfg. Company of York, Pa., manufacturers of ice making and refrigerating machinery. Mr. Pillsbury will open an office in Chicago.

Frank M. Campbell, who has been covering Western Pennsylvania and Ohio for the Park Steel Company of Pittsburgh, has resigned his position and has become representative of Jones & Laughlins, Limited, of the American Iron & Steel Works of Pittsburgh, in the same territory.

J. C. Maloney, superintendent of the Wire Nail and Wire Drawing Department of the Kelly Nail & Iron Company, Ironton, Ohio, has resigned his position to accept a similar one with the Belfont Iron Works, at Ironton, Ohio. Fred. Hunter has been appointed to succeed him.

J. T. Lyttle, lately with the Park Steel Company of Pittsburgh, has been appointed freight agent for the Crucible Steel Company of America, with headquarters in the Empire Building, Pittsburgh.

Wm. E. Taylor, formerly of the American Steel Hoop Company, has been appointed to the position of assistant to President R. S. Warner of the Republic Iron & Steel Company, at Chicago, succeeding Geo. D. Wick, resigned.

The Carnegie Steel Company have about completed a handsome new residence, to be occupied by Joseph E. Schwab, superintendent of the Duquesne Steel Works and blast furnaces, at Duquesne, Pa. New houses are also being built for Chas. McCrery, superintendent of the blast furnaces, and one for R. R. Richardson of the transportation department, at Duquesne.

The Edward P. Allis Company of Milwaukee, Wis., announce that on September 1 they will discontinue their office at Butte, Mont., and will establish an office at Spokane, Wash., in charge of H. V. Croll.

At Pittsburgh a deed has been filed transferring the plant of the La Belle Steel Company, in that city, to the Crucible Steel Company of America, for \$235,435.

The annual convention of the Master Car and Locomotive Painters of the United States will be held in Detroit, Mich., beginning Tuesday, September 11.

# HARDWARE.

## Condition of Trade.

THE summer quiet augmented by an unsettled market causes a continuance of conservative buying. Occasionally a house reports something like a normal business, while with the majority there is a restricted volume of trade. A further weakness has developed in some lines of staple goods. It is to be expected that a complete readjustment of prices to a parity with raw material values will gradually be brought about.

### Chicago.

(By Telegraph.)

Greater stress is laid upon the trade in Nails and Wire than any other Hardware products. One seller remarks that the farmers are now building many corn cribs, and that much of the trade is thus explained. Building operations also are improving. Builders' Hardware has not, however, increased in sale proportionately to that of Nails, but Nails come first in point of use, and the time for other Hardware will be due in a few weeks. Some sellers of Builders' Hardware say they note a slight improvement, and from signs are led to expect quite a brisk demand this fall. Construction in the spring was seriously curtailed by high prices of material, labor troubles and other causes, and a change is coming. At Chicago the number of small buildings under construction is increasing. General Hardware trade continues satisfactory, though partaking largely of the characteristics of summer. A moderate movement in autumn Hardware is in progress, but the distinctive feature of current business is summer goods..

### St. Louis.

No radical changes either in prices or nature of transactions are reported. Jobbers have had a reasonably satisfactory business during the past week; but buyers are still proceeding cautiously in making up orders. From conversations one house have had with their visiting customers the jobber advances the opinion that there exists practically no lack of faith in the excellent condition of the country. At the same time merchants are confining purchases to 30-day supplies, believing that goods may be had a month hence at as low prices as those now ruling, if not lower. This is the season when the weather is an important factor in farming districts. Considerable heat and a somewhat extended period of drought have shortened the hay crop in some sections, and in consequence the demand for Corn Knives has been stimulated, as corn stalks are being fed to cattle in those regions instead of hay. Other districts report an excess of rain, and merchants are holding off to see what effect the rains will have on cotton. The demand for Wagon Material appears fairly active, and out of town business being received by Heavy Hardware jobbers is as good as expected.

## Notes on Prices.

**Wire Nails.**—The demand for Wire Nails is urgent and the orders are frequent. They are, however, mainly for small lots from store. The requests for prompt shipment indicate a limited quantity of Nails in merchants' hands. Prices are without change, as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

To Jobbers in carload lots.....	\$2.20
To Jobbers in less than carload lots.....	2.25
To Retailers in carload lots.....	2.30
To Retailers in less than carload lots.....	2.40

**New York.**—The local demand from store is continuous for Wire Nails, but for small quantities. Requirements on this basis are quite satisfactory for the season. Quotations are as follows:

To Retailers, carloads on dock.....	\$2.48
Small lots from store.....	\$2.55 to \$2.60

**Chicago, by Telegraph.**—Mill business in Wire Nails is large in volume with prices firm. Store trade has the same activity noted for some weeks, but the activity is accompanied by some reports of more strenuous competition than ordinary. The buying demand is widely distributed, but is limited usually to small lots. Prices are nominally unchanged from store at \$2.43 for carloads and \$2.50 for small lots.

**St. Louis.**—No marked activity prevails in the Wire Nail market. Purchases seem confined to limited quantities. The quotable price to retailers in carloads is \$2.45, base; \$2.55, base, for smaller quantities. These prices, however, are frequently cut by jobbers.

**Pittsburgh.**—Orders continue for small lots only, but there is possibly a little better demand. Prices are without change, and we quote as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in ten days:

To Jobbers in carload lots.....	\$2.20
To Jobbers in less than carload lots.....	2.25
To Retailers in carload lots.....	2.30
To Retailers in less than carload lots.....	2.40

**Cut Nails.**—The trade are not anticipating their wants in Cut Nails, but are ordering only for immediate requirements. Orders are usually accompanied by requests for prompt shipment. Quotations are unchanged as follows, f.o.b. Pittsburgh, terms 60 days, 2 per cent. off in 10 days:

Carload lots.....	\$1.95
To Jobbers in less than carload lots.....	2.00
To Retailers in less than carload lots.....	2.10

**New York.**—The local conditions of the Cut Nail market show no change. Orders cover immediate requirements only. Quotations are as follows:

To Jobbers in carload lots on dock.....	\$2.13
To Jobbers in less than carload lots on dock.....	2.18
To Retailers in less than carload lots on dock.....	2.31
Small lots from store.....	\$2.25 to 2.30

**Chicago, by Telegraph.**—Fair trade is reported in Cut Nails, store quotations continuing at \$2.25.

**St. Louis.**—In Cut Nails the volume of business is about the same as in recent weeks at the unchanged price of \$2.50, base, out of stock.

**Pittsburgh.**—Demand is light, and the tone of the market is weak. Buyers are placing orders only for small lots. We quote f.o.b. Pittsburgh, terms 60 days, 2 per cent. off in 10 days, as follows:

Carload lots.....	\$1.95
To Jobbers in less than carload lots.....	2.00
To Retailers in less than carload lots.....	2.10

For good orders it is not unlikely these prices could be shaded.

**Barb Wire.**—Nothing has occurred to change previous conditions in the Barb Wire market, and demand is light. Quotations for domestic trade are as follows, f.o.b. Pittsburgh, net cash 60 days, or 2 per cent. discount for cash in 10 days:

To Jobbers in carload lots, Painted.....	\$2.50
To Jobbers in carload lots, Galvanized.....	2.80
To Jobbers in less than carload lots, Painted.....	2.55
To Jobbers in less than carload lots, Galvanized.....	2.85
To Retailers in carload lots, Painted.....	2.60
To Retailers in carload lots, Galvanized.....	2.90
To Retailers in less than carload lots, Painted.....	2.70
To Retailers in less than carload lots, Galvanized.....	3.00

Ellwood and Baker Wire is 5 cents and Washburn & Moen Glidden 10 cents per 100 higher than the foregoing prices.

*Chicago, by Telegraph.*—A good demand continues to mark the trade in Barb Wire, though there may be a slight recession from the activity of last week. Quotations for small lots, Chicago delivery, are \$2.40 for Plain Annealed, \$2.75 for Painted Barb and \$3.10 for Galvanized Barb Wire.

*St. Louis.*—Business is still somewhat restricted in Barb Wire, with no revision in quotable price. Some jobbers are, however, slightly shading these figures. Painted in carloads is \$2.75; \$2.85 for smaller quantities. Thirty cents advance is obtained for Galvanized.

*Pittsburgh.*—The volume of business is very light, and is for small lots only. We quote: Galvanized Barb Wire, \$2.80, in carload lots to jobbers, and Painted at \$2.50. Terms, 60 days net, with 2 per cent. discount for cash in 10 days, f.o.b. Pittsburgh.

**Plain Wire.**—Requirements for Plain Wire are only fair. Irregularities in price by outside manufacturers are reported for large lots. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days:

	Base sizes.	Plain.	Galv.
To jobbers in carload lots.		\$2.15	\$2.55
To jobbers in less than carload lots.		2.20	2.60
To retailers in carload lots.		2.25	2.65
To retailers in less than carload lots.		2.35	2.75

The above prices are for the base numbers, 6 to 9. The other numbers of Plain Wire and Galvanized Wire take the advances indicated in the following table:

Plain Fence Wire Advances (Catch Weights).			
Nos.	Base	Galvanized.	
6 to 9	Base	\$0.40 extra.	
10	\$0.05 advance over base.	.40 "	
11	.10 "	.40 "	
12 and 12½	.15 "	.40 "	
13	.25 "	.40 "	
14	.35 "	.40 "	
15	.45 "	.75 "	
16	.55 "	.75 "	
17	.70 "	1.00 "	
18	.85 "	1.00 "	

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

*Pittsburgh.*—Demand is dull, and only for small lots. We quote:

	Plain.
To jobbers in carload lots.	\$2.15
To jobbers in less than carload lots.	2.20
To retailers in carload lots.	2.25
To retailers in less than carload lots.	2.35

Galvanized Wire up to No. 14 is 40 cents advance on Plain, Nos. 15 and 16, 75 cents advance, and Nos. 17 and 18, \$1 advance. Terms are 60 days net, with 2 per cent. discount allowed for cash if paid in 10 days from date of invoice.

**Axles.**—Manufacturers announce a reduction in the price of Axles, under date of August 17, as follows:

	Iron.	Steel.
No. 1 Common, Loose Collar.	4 c.	3½ c.
No. 1½ Common, new style.	4½ c.	4½ c.
No. 2 Common, Solid Collar.	4¾ c.	4½ c.
Nos. 7 to 8, 11 to 14, Half Patent, discount.	60 and 10%	
Nos. 7 to 8, 11 to 14, Half Patent, 100 sets, discount.	70%	
Nos. 15 to 18, Half Patent, discount.	60%	
Nos. 19 to 22, Half Patent, discount.	70 and 10%	

**Tarred Roofing Papers.**—The market for Tarred Roofing Papers is now an open one, the arrangement which has heretofore existed among the manufacturers having ceased to exist, the demand proving insufficient to satisfy all of them. Prices have not fallen off as much as might have been expected, the reduction ranging from 10 to 15 per cent. The current prices in average lots are now \$30 a ton in 1-ply, 65 cents a roll for 2-ply and 85 to 90 cents per roll for 3-ply. These figures represent the present condition of the market, although some lots are sold at a higher price.

**Glass.**—The National Window Glass Jobbers' Association have in course of preparation a new price-list of

single and double strength Window Glass. This is one of the results of the association meeting, recently held at Niagara Falls. The design, it is stated, is to have a list subject to one discount for both single and double strength instead of a number of discounts, as is the case at present. Should small Glass be scarce next fire, as it has been the past spring, it may be necessary to have a separate discount for those sizes. The jobbers are waiting until they have closed their contract with the American Window Glass Company for new Glass before fixing the discount to which the new list will be subject. For the present former discounts continue in force, as follows:

#### *Carloads from Factory.*

Single strength:	
First bracket.	85 and 10 %
Second and third brackets.	85 and 15 %
All above.	90 and 5 %

Double strength:	
First five brackets.	89 %
60-inch bracket.	90 %
70 and 100 inch brackets, inclusive.	90 and 10 and 5 %
All above.	90 and 20 %

#### *Eastern Jobbers, Less than Carload Lots.*

Single strength:	
First bracket.	80 and 10 and 5 %
Second and third brackets.	85 %
All above.	85 and 20 %

Double strength:	
First bracket.	85 %
Second, third, fourth, fifth and sixth.	85 and 10 %
All above.	85 and 20 %

#### *Western Jobbers, Less than Carload Lots.*

Single strength:	
First bracket.	80 and 20 %
Second and third brackets.	85 %
All above.	85 and 20 %

Double strength:	
First five brackets.	85 and 10 %
Sixth bracket.	85 and 20 %
All above.	85 and 25 %

Ten per cent. extra for single strength, A.A.

Freight equalized with nearest jobbing center.

**Plate Glass.**—The price of Plate Glass has been advanced from 75 and 10 per cent. discount to 75 per cent. discount from the list.

**Paints and Colors.**—*Leads.*—White Lead in Oil is without change in price. A limited amount of outside work is being done this month, but prospects for an increased consumption of White Lead during the following two months are encouraging. Manufacturers' quotations are as follows: In lots of 500 pounds or over, 6 cents per pound; in lots of less than 500 pounds, 6½ cents per pound.

**Oils.**—*Linseed Oil.*—Buying is confined to small lots of Linseed Oil for immediate delivery. Fifteen barrels, which is termed a dray load lot, is a favorite sized order for those whose requirements are larger than lots of five barrels. For future delivery of carload lots crushers signify their willingness to accept orders based upon present cost of Seed. This figure is in excess of buyers' views. The future price of Oil appears to be largely dependent upon export trade in Flax Seed. Should the foreign demand continue active price of Oil will probably remain high. On the other hand, should the accumulation of Seed in this country become so large that it could not be controlled lower prices for Oil would result. City Crushed Raw Oil is held at 67 cents in lots of five barrels or more, and at 68 cents in lots of less than five barrels. State and Western brands are quoted at 65 cents in lots of five barrels or more. Boiled Oil is 2 cents per gallon advance on Raw.

**Spirits Turpentine.**—The price of Turpentine has fallen off 1½ cents per gallon during the past week, and is now quoted at 40½ cents for Southerns and 41 for machine made barrels. The market is weak and dull. Sales are confined to small lots.

### John Pritzlaff.

JOHN PRITZLAFF, president of the John Pritzlaff Hardware Company, Milwaukee, Wis., died at his home in that city on the 16th inst. Although in his eighty-first year, Mr. Pritzlaff continued to take an active interest in business, and could be found every morning in his office giving attention to certain details of the company's affairs. Two weeks prior to his death he was confined to his home on account of organic ailments, which had caused him more or less annoyance for some time past, and these developed into diabetes, which caused his death.

Mr. Pritzlaff was born in Pomerania, Prussia, on March 6, 1820. At the age of 19 he came to this country with a party of colonists under Pastor Graubau, who founded the Buffalo Synod of the Lutheran Church in America. When he landed in New York he was without a cent in his pocket and was in debt to the amount of \$10. Leaving New York almost immediately, he started for Buffalo, reaching that city sick and penniless. Finding no employment in Buffalo he walked with an axe on his shoulder 60 miles south of that city to where the Genesee Canal was being built and worked in a stone quarry during the fall of 1839 and part of the following winter. In the summer of 1840 he worked on the North Branch Canal, in Pennsylvania. During the summer of 1841 he worked on a farm, and in the fall of that year removed to Milwaukee, and from that time until his death resided continuously in that city, a period of 59 years.

His first employment in Milwaukee was on a farm, for which he received \$9 per month. In the summer of 1842 he was employed as a cook on a schooner, and during the winters of 1842 and 1843 he cut cord-wood at 3 shillings per cord in store pay. Early in 1843 Mr. Pritzlaff entered the hardware business, engaging as a porter for Clark Shepardson, who conducted a retail hardware store. His salary was \$200 per annum, and out of this he had to board and clothe himself. In later years, in speaking of this period of his life, Mr. Pritzlaff would facetiously remark that "boarding himself did not cause him any worry at all, as he slept under one of the counters in the store in which he was employed."

In 1844, Nazro & King purchased the business of Clark Shepardson, and in 1847 Nazro & King dissolved partnership and the firm became Henry J. Nazro & Co. Two years later Mr. Pritzlaff, together with A. F. Suelfloh, arranged to enter the flour and feed business. Nazro & Co., however, made Mr. Pritzlaff an offer of \$550 per annum to remain with them another year. Mr. Pritzlaff was fearful that this was too much money for his services, and frankly told Nazro & Co., who stated they were willing to take the chances, and Mr. Pritzlaff remained.

On April 1, 1850, the firm of John Pritzlaff & Co. commenced business. The firm consisted of John Pritzlaff, A. F. Suelfloh, and Henry J. Nazro & Co. Neither Mr. Pritzlaff nor Mr. Suelfloh had any capital, and the money necessary to conduct the business was advanced by Henry J. Nazro & Co. In 1853 Mr. Suelfloh

sold out his interest, and in 1866 Henry J. Nazro & Co. retired, leaving Mr. Pritzlaff the sole owner of the business, which was conducted under the name of John Pritzlaff until 1884, when it was incorporated under the present name.

On the evening of March 31 last the John Pritzlaff Hardware Company tendered a banquet to their employees, numbering nearly 300, in the Plankinton House, Milwaukee, to commemorate the fiftieth anniversary of the establishment of the business.

In the death of Mr. Pritzlaff the city of Milwaukee loses one of her foremost citizens, the hardware world one of its most honored and successful members, while his employees are called upon to mourn for an employer who was congenial, patient and forbearing, a friend and an adviser. It will be an occasion of sincere sorrow to all who had the privilege of knowing him.

### Freight Classification.

THE question of what freight classification will eventually govern traffic moving into and through the territory south of the Ohio and east of the Mississippi River is one that is arousing unusual interest in commercial circles throughout the South and the States contiguous thereto that have enjoyed close trade relations with that territory. On February 1 and again on June 1 the Southern Classification Committee, which is officially in charge of freight classification matters for the rail and steamship lines in control of the business of transportation to Southern points, so extensively revised the merchandise classification list which had been in effect for many years that the classification now in effect represents burdensome advances made in over two-thirds of the entire list of items classified. The Classification Committee has repeatedly had its attention called, through protests filed by the Merchants' Association of New York City and numerous commercial bodies of other



JOHN PRITZLAFF

cities, to specific instances of advances made that were prohibitory to trade with their section. But notwithstanding that meetings have been held by that committee at Chicago on July 3 and at the Oriental Hotel, Manhattan Beach, New York, on August 7, for the apparent purpose of reconsidering their action in recommending the advances made, no action in the direction of promised reductions has yet been announced. Meanwhile, a feeling of mistrust as to the sincerity of the committee in its professions of a desire to rescind all irksome advances has developed. This feeling, which is general through the South, North and West, has been brought to the attention of the Railroad Commissioners of all the Southern States, who have arranged to meet at Lookout Mountain, Tenn., on August 29, and jointly take up the question of promulgating a general classification to govern freight in Southern territory that will be reasonable, official and legal in that region.

The Merchants' Association has been invited to send a representative to appear in its behalf at the meeting of the Railroad Commissioners, and J. M. Langley of the office staff has been directed to attend. Mr. Langley, in his argument at Chicago before the Southern Classification Committee on July 3, pointed out to them at that

time the probability of just such a prospect, if the advances complained of were not modified. Since that time the Commissioners of the Carolinas, Georgia and Mississippi have declined to accept as legal the Southern Classification known as No. 27, which was issued on June 1.

The outcome of the meeting at Lookout Mountain will be awaited with deep interest by shippers and commercial bodies. But meanwhile plans which are being discussed among them for combining small shipments into carloads and patrolling independent water lines to effect economies in transportation expenses will not be interrupted.

### The Fairmount Fork Works

THE plant of the Fairmount Fork Works, Sheble & Klemm, proprietors, was entirely destroyed by fire on September 27, 1899, but rebuilding was immediately begun upon the same site, and the new plant, consisting of nine buildings—viz., forge shop, polishing and tumbler shop, ferrule and handle preparing shop, handle storage building, power house, machine shop and finishing shop, stock building and offices, blacksmith shop and stable—was completed by April 23 last, and is now in full operation. In designing the new works, which occupy nearly 3 acres, their 50 years of experience in the manufacture of steel goods enabled the most practical arrangement of both buildings and machinery, and the plant and its equipment are thus modern and up to date. The buildings are constructed of brick and stone, except the handle storage building and blacksmith shop, which are of corrugated iron. All the buildings have been planned according to the slow burning construction idea. The machinery and placing of the same shows able judgment, unnecessary handling being reduced to the minimum. The motive power is supplied by a 200 horse-power Otto gas engine; gas being produced on the premises at a very low cost. With their present facilities the manufacturers are able to turn out daily 300 to 350 dozen Forks, Hooks, Rakes, &c., of different styles and shapes, including Hay, Manure, Spading, Street, Straw, Sluice, Oyster, Coke, Coal, Ballast and other Forks; Potato and Manure Hooks; Garden, Ballast and Asphalt Rakes of varied styles for varied uses.

The goods are divided into three different classes, the first class bearing the label Sheble & Klemm, with trademark. The second grade goods are made to supply a demand for goods of less price than the first grade, and are handled under the label of "The Pennsylvania Fork Company." The third quality are low price, serviceable goods, and are sold under the label of the "Eagle Tool Company." The goods of the Fairmount Fork Works have been exported to foreign countries for the past 40 years, and fully one-half of the present output, we are advised, is being exported. Their long experience in this branch of the business enables them to give special attention to foreign business. All goods manufactured by the company are manufactured from the best quality of material, and are made with solid shanks and have the prongs forged out under trip hammers from a solid piece of steel.

### New Plant of the Haven Malleable Castings Company.

THE HAVEN MALLEABLE CASTINGS COMPANY, successors to the Jas. L. Haven Company, one of the oldest manufacturing concerns in the line of Hardware Specialties in that city, are now located in their new and fully equipped shops at the corner of Dane and Knowlton streets and C. H. & D. R. R., Cincinnati, Ohio. The main building or molding shop is 100 x 200 feet, with accommodations for 100 hands; annealing room is 60 x 165 feet, accommodating 50 to 60 hands; machine shop is two stories, 60 x 100 feet, and accommodates 50 hands, with separate buildings for engine room, furnace room and pattern shop, all of brick. The company, comprising Wm. A. Haven as president and general manager, Jas. L. Haven, vice-president, and Henry J. Schumacher, secretary and treasurer, have 3½ acres of ground, but the present plant only covers about 1½ acres. They are prepared to manufacture Malleable Castings of every description, with an annual capacity of 3000 tons, and have direct connections with the C. H. & D. R. R., having a switch right to their door. Having a model and up to date plant, with all modern appliances, the company advise us that they are prepared to furnish Malleable Castings of all kinds promptly.

Jolley, Washburn & Co., Milton, Iowa, have been succeeded by Jolley & Washburn.

### Origin and History of Cutlery Sample Rolls.

THE origin and evolution of the Cutlery Sample Roll, now common with all Cutlery men and Hardware merchants, may interest the trade, especially the older ones, who will remember when Pocket Knife samples were fixtures which could not be readily picked up by prospective purchasers and examined freely, an important detail in the selling of goods, as any expert salesman knows. This common desire to feel or gauge an article is not confined to those who handle Cutlery; buyers for wholesale houses and consumers alike being instinctively desirous of handling whatever they contemplate purchasing. P. L. North & Son, 16-18 Reade street, New York, are well known as manufacturers of almost everything used in the trade for sampling all kinds of Cutlery, Silver Ware, Tools, Instruments, Padlocks, Bits, &c., but comparatively few know where, how and when the Cutlery Sample Roll, now a trade necessity, first came into existence. The following facts, obtained from P. L. North himself, who conceived and established this industry for the proper presentation of samples of this character, will interest those who use them:

There were no sample rolls prior to 1857. There were a few sample cards brought from England in book form, on which Knives were secured. When the business of American cutlers had measurably increased it became necessary to place their manufactures before the trade. Travelers were sent out who carried the book cards referred to. This practice prevailed until about 1859. P. L. North was then foreman for Julius Erbe, 169 Broadway, who had been making quite a number of these cards for John Russell & Co., Meriden Cutlery Company and Lamson & Goodnow. About that time he also made what were called wraps for the carrying of surgical instruments. Mr. North conceived the idea of making rolls for Table Knives, and as a starter made one to hold 12 Table Knives of leather lined with chamois. This he took to John Russell, then located in the neighborhood of Cliff and Beekman streets, for criticism. After Mr. Russell had adjusted his eyeglasses and examined the device he asked, "What is it?" a phrase popularized by P. T. Barnum about that time. Continuing his examination he finally shoved it aside, saying, "Young man, do not bother your brains about that; your people make very good cards; stick to cards." Mr. North, not satisfied with his conclusion, asked, "Won't you let your Mr. Hawkes see that?" A boy was called and told to put the roll on Mr. Hawkes' desk. About three days after that C. K. Hawkes came into Erbe's and, accosting the foreman, said, "Is your name North?" giving his semi-military hat a tilt one side, a characteristic that the older merchants will remember. His comment was, "I think it a pretty — good thing; couldn't you make one a little larger to hold 16 or 18 Knives?" This detail being settled, his next inquiry was, "Do you know Booth? Well, don't say a word to Booth about it, but when it is finished wrap it up and send it down to the office." In due course Mr. Booth, who, with Mr. Hawkes, became veteran travelers for the John Russell Cutlery Company, called on Mr. North and said: "Young man, you made a Cutlery Roll for Hawkes," and taking up a Knife, shoved it into one of the spaces of the original Roll which Mr. North was finally compelled to exhibit. He decided to make a Roll for Mr. Booth to hold 24 Knives, which was duly delivered. Nothing further was heard for, say three months, when a letter was received from the South, calling attention to this method of sampling Cutlery, the Roll having been seen in Mr. Hawkes' possession, with a request that a duplicate be made and forwarded. Again, in two or three months, a similar request was made from some other section, where the Rolls had been carried by the salesmen, it always having been the invariable custom to have the maker's name on the Roll. There the matter dropped and nothing further was heard for some time.

About 1860, when Mr. North started in business for himself, he made a sketch of a Cutlery Roll, the same as has since been used on their bill heads as a sort of trade-mark, and incorporated it in the form of a circular, sending them broadcast over the country to the Hardware trade and to any who were likely to be interested in them. No prices were given in the circular, but in a short time there came inquiries for prices from all quarters, and orders began to come in, but the trade hung fire, he getting an order for only a Roll or so at a time. (Then they were used only for Table and Pocket Cutlery, and it was not until 1874 or 1875 that they were used for Razors, Scissors, Spoons, Forks, Carving Knives and similar goods.) In the earlier years if he got an order for two or three at a time he was elated. As time progressed orders increased, so that they read for 1, 2 or 3 dozen. About 1870 Landers, Frary & Clark first undertook to carry a full line of these Rolls for Carvers, Butchers', Table and Pocket Cutlery in stock as merchandise. Then Rolls were made only with leather backs and chamois linings, but about 1875 the first big order for 100 Rolls was given by the Simmons Hardware Company, with fine quality blue silk linings. About 1884-'85 they began to use velvet for linings and subsequently silk plush. The trade increased very greatly, so that after a while as many as 7000 or 8000 Rolls were made a year, increasing to 10,000. At an early date, about 1873, Mr. North began to introduce canvas covers, which it was found wore better and cost a little less to make. Between June, 1895, and March, 1897, he made for one concern alone 30,000 of these Rolls. A few years ago they commenced making them for Padlocks, for some of which they got as much as \$30 apiece. They also make 100 piece Rolls with recesses for Knives, partitioned with felt and covered with plush.

Charles J. Healy, once up in Minneapolis, in the office of Janney, Semple & Co., was asked where Cutlery Rolls could be bought, and having given Mr. North's name was asked, "Well, who else makes them?" Mr. Healy replied, "Why, I didn't know any one else made them."

A great many novelties have been brought out from time to time, some of which are very ingenious for holding a dozen Razors, or a half dozen Drills, &c. The goods are sent all over the country, are exported to Australia, South Africa and even to Sheffield, England. They were evidently not known in Germany prior to 1874, when one of the partners in a New York house bought one of every kind to show the Germans. They were never used in England until the first lot was sent from here.

### Bridgeport Mfg. Company's New Plant.

THE BRIDGEPORT MFG. COMPANY of Bridgeport, Conn., have already moved into their new factory, where they have largely increased and improved facilities for the manufacture of all grades of Scissors, Shears, &c., from the finest quality of steel laid to the cheapest grade of Hard Cast Shears. In building their new factory they have followed the plan which has been used with a great deal of satisfaction in textile mills, but we believe has not been used to any great extent in Hardware manufacturing lines—namely, the saw tooth construction of roof, which presents a solid area of light from one side of the factory to the other in a series of tooth gables. The light is shed through ribbed windows into every nook of the factory, though throwing absolutely no direct glare of the sun, and this is found to be a very desirable system of day lighting, especially where fine polishing is required and delicate tool making operations are carried on.

We are informed that in addition to their rapidly increasing business in the manufacture of Hardware Specialties the company are also at work upon large contracts for goods to be marketed by others, and this branch of their business is growing about as rapidly as their other departments. The mechanical operations are under the direct supervision of a member of the American Society of Mechanical Engineers, who has had a large experience in all kinds of metal goods, especially in sheet metals, and the company are thus in a position to execute contracts for anything in the line of

specialties composed wholly or in part of metal. Contracts in this line and especially for goods which must be made automatically to insure low prices are solicited by this company and prompt estimates will be furnished.

### Letters from the Trade.

*Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.*

#### "Money Back If You'll Take It."

In the following letter our correspondent refers approvingly to the growing practice of refunding money to customers who desire to return goods:

In a recent issue of *The Iron Age* a Pennsylvania merchant sets forth the advantage of refunding money without question when goods are returned. He even goes so far as to send his delivery wagon after such goods when a customer notifies him that they are, for any reason, unsatisfactory. By this plan, he says, he has gained much new trade and also enjoys more completely the confidence of his regular patrons.

The plan is one which can be followed to advantage by any business man. Of course, it is necessary that the goods shall be returned in good condition, and this is a point that may in some instances cause trouble unless careful judgment is exercised. Some years ago, in Philadelphia, the advertising manager of a large mercantile house created quite a sensation by coming out boldly with the catch phrase, "Money back if you'll take it." This was only a terse way of saying that money would be refunded upon any unsatisfactory purchase. There is, however, a deeper ring to the sentence than the mere statement of money refunded. It carries with it the impression that the goods sold by this house are of such high order of excellence that the purchaser would not be willing to take them back. This point in itself, it has been claimed, makes many people loath to exchange goods even though they may be somewhat dissatisfied with them.

There are many large concerns throughout the country which do an enormous business, and yet they will not refund money upon any purchase. In most instances these houses have a plan of exchange which permits a buyer to return an unsatisfactory purchase and receive other goods of equal value. This plan, while it seems very fair upon the face of it, is, nevertheless, the cause of much dissatisfaction among shoppers, and frequently results in the loss of trade. There are many instances where money refunded without question will save the patronage of some good customer to a house, while the plan of exchanging for other goods will create dissatisfaction. The plan of refunding money seems to be a broader, better business principle than the one of urging upon a customer some other merchandise in exchange, and it would seem that the time is not far distant when the practice will be far more common than it is at present.

#### Catalogue House Competition.

The following letter from a Hardware house in Texas refers to catalogue house competition and how the Hardwareman can meet it. It will be observed that the necessity of buying and selling for cash is pointed out, as well as the carrying of a full assortment of goods:

Discussions of the catalogue house question in *The Iron Age* are quite frequent, mostly by retail Hardware associations.

All things being equal, or the same, results ought to be the same. If the retail dealer in a town has just reason to complain that the catalogue house is sharing his trade with him it cannot be reasonably attributed

to any other cause than the difference in the way they do business.

If a catalogue house can reach out and sell goods a thousand miles from home in competition with a local dealer there is evidently a cause for it.

Probably no man in existence would buy goods away from home if they are obtainable at home and as cheap, for it would be folly to pay an extra transportation expense, however small. So I think you can arrive at a correct solution of this question and remedy therefor if you will compare the catalogue house's way of doing business with your own.

The catalogue house is a shrewd cash buyer. What are you in that respect?

The catalogue house buys rather largely. How do you buy?

The catalogue house keeps an assortment to suit the varied demands of the people. What do you keep?

Lastly, and one of the most powerful weapons in the hands of the catalogue house, it sells strictly for cash. How do you sell?

You can transport goods in retail quantities cheaper in proportion than a consumer can transport a few articles at a time, so in this particular you ought to have the advantage of the catalogue house.

My advice to all merchants who have suffered loss by catalogue houses is this: Do business like the catalogue house, all except the catalogue, and no catalogue house on earth can hurt your trade.

#### A RETAIL DEALER.

### Requests for Catalogues, &c.

WADE & HENRY have just opened up in business at Mount Olive, Miss., carrying Hardware, Farming Implements, Glassware, Wooden Ware, &c. The new firm will be pleased to receive catalogues and quotations from manufacturers and jobbers in these lines.

Harry Mead, dealer in Farm Machinery, Wagons, Buggies and Harness, Shawnee, Okla., with branch store at McLoud, is adding Shelf Hardware and Stoves to his former line, and will appreciate copies of catalogues, price-lists, &c., pertaining thereto.

### Trade Items.

THE large factory of the Kelly Axe Mfg. Company, Alexandria, Ind., was destroyed by fire on the night of the 19th inst. The office, warehouse and machine shops were, however, saved from destruction. The company advise us that they will rebuild at once, putting up a modern fire proof structure with largely increased capacity.

E. C. ATKINS & Co., Indianapolis, Ind., have issued an illustrated pamphlet souvenir for distribution at the Paris Exposition in connection with their exhibit. It is finely printed and handsomely illustrated, showing details of their manufacturing plant, as well as a view of their factories. It is printed in French and English and bound in an illuminated cover.

THE Hardware business formerly conducted by Francisco L. Cantu at Monterey, Mexico, is now being carried on by Cia. Ferretera de Monterey "El Barco," S. A., organized with a capital stock of \$300,000. Mr. Cantu is president, Agustin Huguet, vice-president and treasurer, and J. P. Boesch, secretary.

E. BISSELL & Co., 12 Murray street and 15 Park place, New York, in a Special Notice in this issue, announce important trade sales of Table Cutlery, Silver Plated Ware, Scissors, Shears, Razors, Pocket Knives, &c., on August 28 and 29. The assortment which will be offered is referred to as large and worthy the attention of the jobbing and retail trade, and the entire sale will be without reserve.

THE AMERICAN APPRAISAL COMPANY, Milwaukee, Wis., have received a testimonial letter from the American Hide & Leather Company, of which they are quite proud. The letter refers to the appraisal of their different plants as very satisfactory. The appraisals were taken solely for insurance purposes, and since that time the company have had two fires and the adjustments have been made upon these appraisals of property, the

losses being quickly adjusted to the satisfaction of both insurer and insured. The American Hide & Leather Company are a consolidation of the tanneries, and the letter above referred to represents something over 60 appraisals.

JENSEN, KING, BYRD COMPANY, Spokane, Wash., have incorporated, with a capital stock of \$75,000, and will continue the wholesale and retail business in Shelf and Heavy Hardware, Stoves and Tinware, Wagon Wood Stock, &c. The capacity of their establishment has been doubled.

### Price-Lists, Circulars, &c.

W. R. OSTRANDER & Co., 22 Dey street, New York, have just issued the twelfth edition of their revised catalogue. They are manufacturers of Patented Speaking Tube Hardware, Electric Bell Goods, Electric Light Material, Telegraph and Telephone Goods and General Electric Supplies; also dealing in full lines of Bell Hangers' Hardware and Electric Pulls. The book is a complete one of 262 pages, and they state that they are prepared to furnish promptly anything in the electric line even though not listed in this book.

THE PHILIP CAREY MFG. COMPANY, Lockland, Ohio: Flexible Roofing, &c. An illustrated catalogue relates to Carey's Magnesia Flexible Cement Roofing, Asbestos Magnesia Sectional Steam Pipe and Boiler Coverings, Asbestos and Asphalt Materials. These goods and their uses are described at length in the catalogue.

T. C. PROUTY COMPANY, Midland, Mich.: Door Hangers. An artistically printed catalogue illustrates, with descriptions, Parlor and Barn Door Hangers. Particular attention is given to the company's No. 4 Parlor Hanger.

CLEVELAND FOUNDRY COMPANY, Cleveland, Ohio: Pamphlets devoted to Puritan Gas Heaters and Radiators and Puritan Smokeless Oil Heaters.

JOSEPH DIXON CRUCIBLE COMPANY, Jersey City, N. J.: Paint Booklet No. 6 calling attention to Dixon's Silica Graphite Paint.

H. F. OSBORNE COMPANY, Newark, N. J.: Illustrated circular of the Osborne Meat Juice Presses, showing five sizes, listing from \$1.25 to \$10 each.

KAMPFE BROS., 8 Reade street, New York: Illustrated catalogue showing details of their Star Safety Razor, together with various sets and combinations, ranging in price from \$2 to \$18 a set at retail.

### Among the Hardware Trade.

E. M. Michener has purchased the Hardware stock of I. N. Lynch in Baxter Springs, Kan., and is continuing the business at the old stand. About \$500 worth of new goods have been added to the stock thus acquired.

McCarroll Bros. have bought the Hardware and Stove store formerly conducted by the late P. C. Biddison, Ottumwa, Iowa. A number of improvements have been made in the store, and the stock has been materially enlarged.

Fire destroyed the store of the Washington Hardware Company, Washington, Kan., a short time since. The building and stock were a total loss. The firm are intending to rebuild.

Walter G. Clark & Son have succeeded Walter Clark in the retail Hardware, Tinware and Crockery business, at Corydon, Iowa.

M. A. Collins, dealer in Hardware, Stoves, Mill Supplies, &c., Frankfort, Ky., lost over \$10,000 worth of goods by fire a few days since. His warehouse, containing about \$2000 worth of goods, was saved. Mr. Collins will rebuild, and expects to resume business about the first of the year.

A. C. Bunney is successor to White Hardware Company in Garden Grove, Iowa.

Newton & Driskill have opened up in the Hardware, Stove, Agricultural Implement and Sporting Goods business, at Okarche, O. T.

The firm of Guernsey & Long, Orlando, Fla., have dissolved partnership. Mr. Long has disposed of his interest to and will be succeeded by Jos. L. Guernsey under his own name. The latter expects to add Harness, Buggies and Wagons to the line of goods formerly handled.

T. M. Rucker & Co., Bosworth, Mo., have disposed of their stock of Hardware, Stoves, &c., to the Bosworth Hardware Company.

## Miscellaneous Notes.

### Flexible Razor and Knife Cases.

E. A. Cauter, 147 West Broadway, New York, is manufacturing flexible leather two, four, six and seven day razor cases in black grain leather for individual use, to be carried in the pocket. The seven-day size have the days of the week printed in gilt on each strap. When closed, the flap being caught with a glove button, the case is  $6\frac{1}{4} \times 3\frac{1}{4}$  inches in dimensions. Flaps on each side of the case meet in the center and cover and protect the razors, the latter being held in position by straps stitched to the case. The cases are lined with tan buckskin. He also manufactures for hardware and cutlery dealers a pocket knife case of light tan leather, which he guarantees will not tarnish or corrode the steel or metal portions of the knife by rust or otherwise. It has been found that the materials often used in tanning leather cause corrosion, thus ruining the salability of the knife.

### Phenix Hanger and Fastener.

The Phenix Mfg. Company, Milwaukee, Wis., have recently placed on the market the Phenix hanger and fastener No. 4, which is referred to as offered to meet the demand for a low priced hanger.

### Crescent Abrasive Company.

Crescent Abrasive Company, Croton-on-Hudson, N. Y., are manufacturing Turkish and American emery. The emery is offered in kegs, about 350 pounds; half kegs, about 175 pounds; drums, about 75 pounds, and 10-pound tin cans, ten in a case.

### Brown's Perfection Bolt Case.

The accompanying cuts relate to a Bolt case offered by A. R. Brown, Erwin, Tenn. The case revolves and is supplied with 40 drawers, so designed that each drawer is of a different size and suitable for one package of Bolts, varying, it is shown, from the smallest size up to those  $1\frac{1}{2} \times 13$  inches. The drawers are all square cornered, as shown in Fig. 2, and allow of the greatest num-

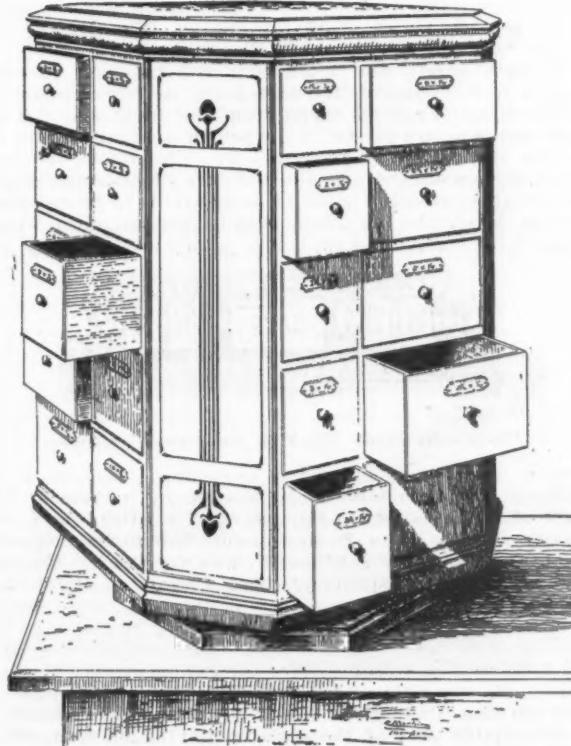


Fig. 1.—Brown's Perfection Bolt Case.

ber of Bolts, and no vacant space is left in the center of the case. The labels on the drawers can easily be removed and others inserted to suit any assortment of Bolts or other articles. While the case is designed for small stores, it is suggested that it will be found con-

venient in larger ones to hold Nuts, Washers, Plow Bolts or other small articles. Additional points of excellence are mentioned as follows: That the drawers cannot be returned to any but the correct place, as they are all of different size; that the revolving feature is of the simplest possible construction and works easily, and that

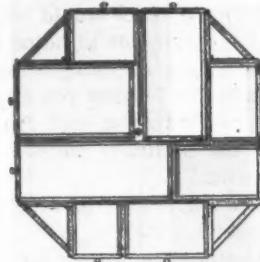
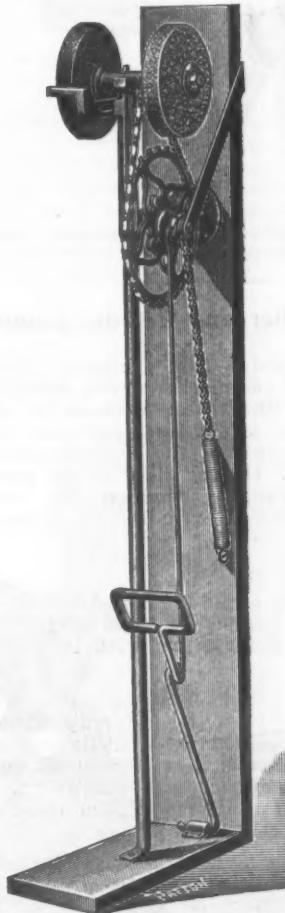


Fig. 2.—Plan of Brown's Perfection Bolt Case.

the case is neat in appearance and substantially made. The low price of the case is a point emphasized by the manufacturer.

### Reisch's Foot Power Emery Wheel No. 2.

The Buffalo Emery Wheel Company, Buffalo, N. Y., are putting on the market another emery wheel grinder, which is catalogued No. 2, as shown in the accompany-



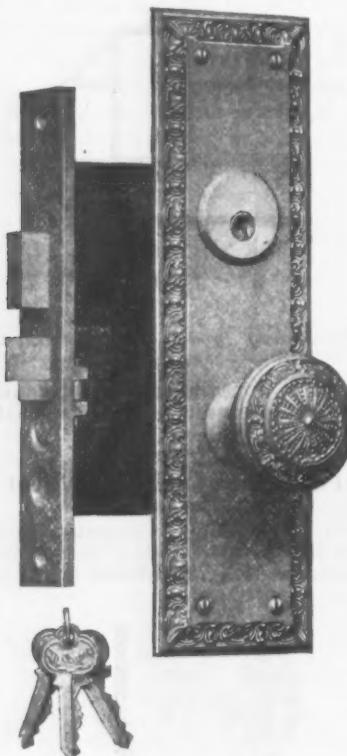
Reisch's Foot Power Emery Wheel No. 2.

ing cut. The grinder has a chain, instead of a belt as in their No. 1 machine. The mandrel is arranged for two emery wheels instead of one, and the company state that the speed of this machine is nearly twice as great as that of their No. 1 grinder.

### Nassau Design.

Norwalk Lock Company, South Norwalk, Conn., and 23 Warren street, New York, have recently put on the market a number of new and attractive designs for door and inside trim, in the way of builders' hardware, one of which, the Nassau design, is here illustrated. This is made in cast bronze metal and can be had for front, vesti-

bule and inside door sets, together with the various small pieces, such as push buttons, sash lifts, draw pulls, finger plates, door pulls, &c. Other designs of the same character have been brought out and are designated by the names Albany, Beverly and Fairfield, with others

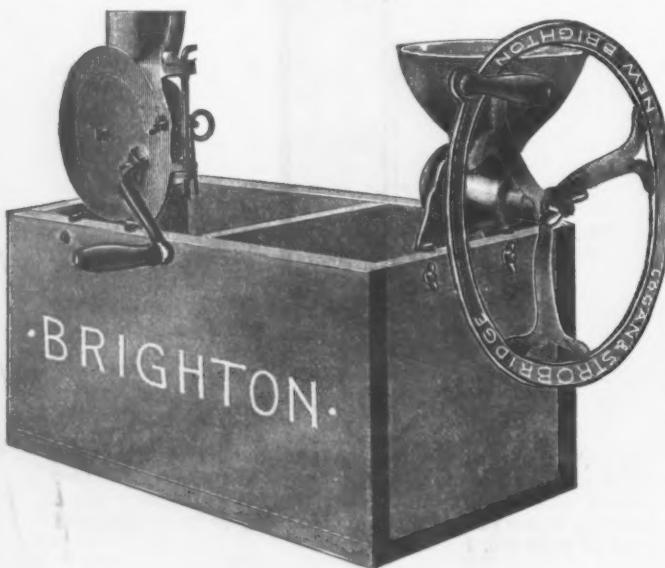


*Nassau Design.*

about to be introduced. The company issue booklets illustrating and describing the features of each design.

#### Corn Sheller and Grinder Combined.

Logan & Strobridge Iron Company, New Brighton, Pa., are putting on the market a corn sheller and grinder combined, as here illustrated. Corn on the ear is shelled by the device on the left of the illustration, the ear being introduced vertically and the kernels removed by revolving the crank. On the right is the grinder, which can also be used for grinding rice, coffee, spice, &c., it being capable of grinding all grades, from fine



*Combination Corn Sheller and Grinder.*

flour to merely cracking the corn. It has a hopper capacity for 3 quarts, and will grind from  $\frac{1}{2}$  bushel to  $1\frac{1}{2}$  bushels per hour, according to the fineness of the product and speed at which the mill is run. The corn sheller is said to have a capacity of 6 or 7 bushels per hour. A feature of the box is the separate bins for the meal and the grain.

#### Guardian Cash Register for Domestic and Foreign Use.

Whiting Mfg. Company, Northboro, Mass., in addition to their regular line of cash registers have put on the market the Guardian No. 25, here illustrated. These registers are very simple in construction, the object being to avoid complicated parts and mechanism. By the



*Fig. 1.—Guardian Cash Register No. 25.*

use of nine different denominations of checks it will record all amounts from \$0.01 to \$99.99. In addition, a separate compartment receives cardboard checks for recording entries, such as accompany amounts "Rec'd on Acct.," "Paid Out," "Charges," or sales when desired to record articles sold and special transactions of any character. The cardboard checks measure  $3 \times 1\frac{1}{2}$  inches and provide ample room for details. The register unlocks in front, from which all parts are accessible. It has new safety and regulating attachments. In operation, to record sales, the proper checks representing the amount having been taken from the rack provided for this purpose, are placed in the proper apartment, and the crank turned as far as it will go. This opens the cash drawer, sounds the bell and exhibits the amount, where it remains exhibited until the next sale is to be recorded, when the checks are automatically discharged into their respective compartments below, under lock and key, the



*Fig. 2.—Detachable Top Sign for English Currency.*

key of which is held by the proprietor. The check retaining compartments are accessible by a door at the rear of the register. For amounts "Paid Out," no metal checks are used, as these amounts are to be deducted from receipts. The cardboard check for this transaction itself opens the cash drawer, &c. Charge checks do not open the drawer, as no money is received. The dimensions, not including the top sign, are 16 inches wide, 13 inches deep and 15 inches high. This register can also be furnished in suitable form for export trade. For export, only the title of the currency requires change, as the top sign bearing the words "Amount Purchased" is a detachable part of the register, having no connection with the mechanism and only serving to make it more ornamental and conspicuous. It can be omitted if necessary without departing from the general utility of the register. For export the register is furnished with a sign similar to that illustrated in Fig. 2, in this case being suited to English currency, showing pounds, shillings, pence and farthings. It can also be furnished for French, German, Spanish and other currencies as ordered. It is finished in seal grain black and metal nickel plated base and trimmings, giving an ornamental appearance.

**Improved Star Safety Razor.**

Kampfe Bros., 8. Reade street, New York, have recently put on the market an improved form of their Star safety razor, as here illustrated. Fig. 1 shows the frame

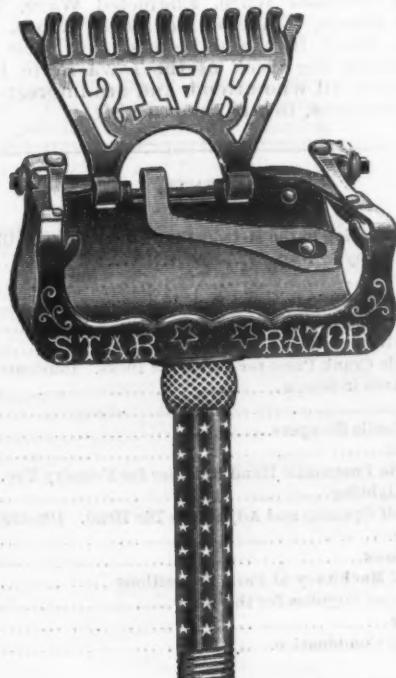


Fig. 1.—Improved Star Safety Razor, with Guard Open

with swinging guard ready for cleaning. The improvement, although not materially altering the razor's appearance, is important and consists of the adjustable clips on each side of the frame by means of which blades are

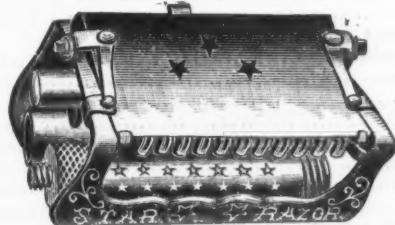


Fig. 2.—Showing Frame, Blade and Handles Complete.

held in their proper position. This device requires no expert skill to manipulate. In one end of the handle there is a slot which serves to adjust the screws on either side of the clips, there being a small washer with an

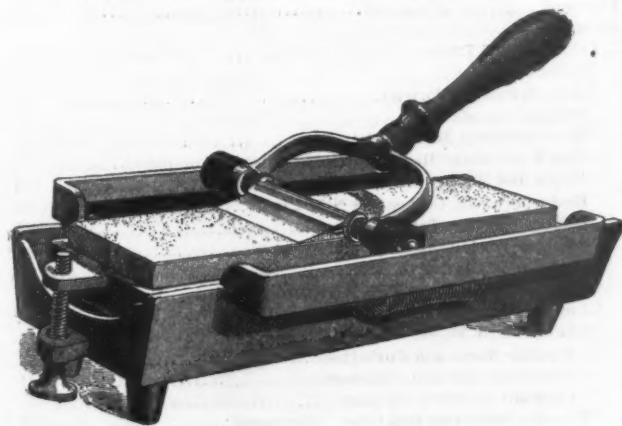


Fig. 3.—Star Honing Machine for Safety Razor Blades.

elongated slot, which permits the clip to be moved upward or downward to accommodate blades varying slightly in thickness. Fig. 2 shows the frame, blade and handles complete as when put up singly in metal containers, although sets containing two to seven blades

with brush, soap, cosmetic, strop, &c., are put up in handsome leather cases. They have also just put on the market the Star honing machine, for sharpening the safety razor blades, as illustrated in Figs. 3 and 4. Fig. 3 shows the water trough of cast metal, which is finished in aluminum, with a razor hone in position, together with the device for holding the blade. The hone rests on a frame with spiral springs at the four corners, which impart a certain desirable flexibility, of value in honing. On each end are brass adjusting screws to raise the hone if it becomes worn. On each side is a leather bearing surface for the hard rubber rollers of the handled blade holder to work on. Fig. 4 shows to better

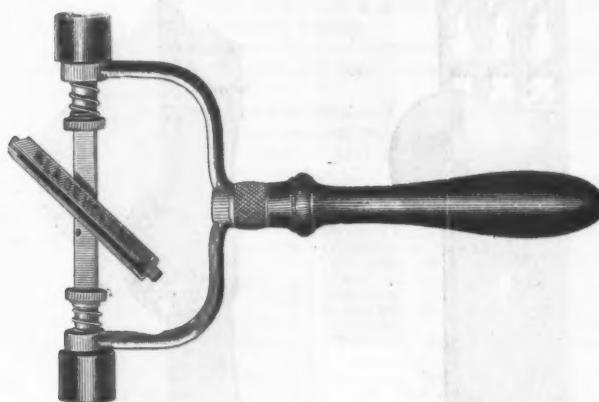


Fig. 4.—Device for Holding the Blade.

advantage the honing handle. It is only necessary to slip the blade into the holder, which is pivoted, when by pressing both collars outward it can be swung into place, the spiral springs forcing the collars back into position again to keep the blade in its proper place. In operation it is only necessary to move the machine backward and forward on the stone, the blade being automatically reversed at the end of each stroke, requiring no skill whatever to properly hone the blade. Stropping the blade is done upon swing strops made by them, for which another holder is supplied.

**The Hercules Cutting Nipper.**

The Bridgeport Mfg. Company, Bridgeport, Conn., are introducing the cutting nipper herewith illustrated.



The Hercules Cutting Nipper

It is forged from the highest grade of sheet steel, and is made with compound lever to secure an easy cutting tool of great power. The nipper is an addition to the company's line of forged steel tools.

## Art Hardware.

Reading Hardware Company, Reading, Pa., and 98-98 Read street, New York, have recently added a number of new designs to their already extensive line of art hardware for interior trim, two of which are here illustrated. Fig. 1 represents the Worcester design, a handsome pattern in English Gothic, which is suited for use on private residences as well as for church and public buildings in the Gothic style of architecture. In this design the surfaces are perfectly flat, the ornamentation consisting of an open latticed Gothic pattern at the ends of each plate, producing a very pleasing effect. Fig. 2



Fig. 1.—Worcester Design.



Fig. 2.—Gemona Design.

shows the Gemona design in Flemish style, with raised ornamentation in lines and scrolls gracefully executed. The same patterns are repeated and carefully carried out in all door and window trimmings. Both of the designs referred to are made in cast bronze, and can be furnished in any desired finish. In this connection the announcement is made by the company that they are about to issue a 16-page supplement to their architects' catalogue, in the form of extra pages, which it is expected will be ready for distribution about September 1 next.

## Royal Lather Brush.

The accompanying cuts relate to a lather brush offered by the C. E. Thompson Mfg. Company, Troy, N. Y. The illustrations show the brush in the different forms into which it is convertible by the sliding of a movable ferrule. This allows the use of a long or short brush. The object of the adjustment is to cause the lather to penetrate and soften both skin and beard by being



Royal Lather Brush, Open, Half Open and Closed.

rubbed in with a short bristle brush. The manufacturers claim that the brush will not twist nor curl, but keep straight and solid, and it is guaranteed by them not to shed bristles. The brush is made with polished aluminum ferrules, fine French bristles and ebonized handle.

Luthe Hardware Company, Des Moines, Iowa, announce that their newly organized exclusively wholesale hardware house will open its doors on the 27th inst. The company are located in a new and commodious

building, constructed especially for their use, and equipped with all modern facilities for receiving and discharging freight on an extensive scale. While they will carry a complete stock of all goods pertaining to the hardware business, particular attention will be given to Carpenters' and Edge Tools, Builders' and Shelf Hardware, Farming and Garden Tools, Household and Kitchen Articles, Wooden Ware, Enamelled Ware, Tinware, Sheet Iron Goods, Tinnery Machines, Ropes, Cutlery, Tin Plates, Sheet Iron and Metals, &c. The opening occurring during the week of the Iowa State Fair, the company invite all who attend, and are interested in the hardware business, to pay them a visit.

## CONTENTS.

	PAGE.
Hydraulic Engineering in the Metropolitan Power House.—Illustr.	1
Wireless Telegraphy in War.....	4
Lake Ore Matters.....	5
The Paris Meeting of the Iron and Steel Institute.....	6
The Norton Grinding Company.....	6
Central Pennsylvania News.....	6
The Bliss Double Crank Press for Armature Disks. Illustrated.....	7
American Pig Iron in Silesia.....	7
A New Alloy.....	7
Carborundum Ladle Stoppers.....	7
Magnalium.....	8
The Philadelphia Pneumatic Hand Hammer for Foundry Use. Ill.	9
Acetylene for Lighting.....	9
The Lavigne Self Opening and Adjustable Die Head. Illustrated.....	11
Iron Ore in 1899.....	12
Pacific Coast News.....	14
Horse-Power of Machinery at Paris Expositions.....	14
Machine Tools and Supplies for the Navy.....	15
Canadian Notes.....	16
A Metal Roofing Combination.....	16
Editorials :	
Our Gold Medal.....	17
The Capital of Industrials.....	17
Gold Exports and the Money Market.....	17
Coal Economy.....	18
The Chicago Building Trade War.....	19
Obituary.....	19
Paris Exposition Awards.....	20
The Armor Plate Problem.....	21
Manufacturing :	
Iron and Steel.....	22
Machinery.....	22
The Iron and Metal Trades :	
A Comparison of Prices.....	23
Chicago.....	23
Philadelphia.....	24
Cleveland.....	25
St. Louis.....	26
Cincinnati.....	26
Birmingham.....	26
Pittsburgh.....	27
The British Iron Market.....	28
New York.....	29
Metal Market.....	29
Iron and Industrial Stocks.....	30
The Pressed Steel Car Company.....	31
The East River Bridge Injunction.....	31
The New York Machinery Market.....	32
The Philadelphia Machinery Market.....	33
The Wage Scales.....	34
The Brown Hoisting Machinery Company.....	34
Personal.....	34
Hardware :	
Condition of Trade.....	35
Notes on Prices.....	35
John Pritzlaff. Portrait.....	37
Freight Classification.....	37
The Fairmount Fork Works.....	38
New Plant of the Haven Malleable Castings Company.....	38
Origin and History of Cutlery Sample Rolls.....	38
Bridgeport Mfg. Company's New Plant.....	39
Letters from the Trade.....	39
Requests for Catalogues, &c.....	40
Trade Items.....	40
Price-Lists, Circulars, &c.....	40
Among the Hardware Trade.....	40
Miscellaneous Notes :	
Flexible Razor and Knife Cases.....	41
Phenix Hanger and Fastener.....	41
Crescent Abrasive Company.....	41
Brown's Perfection Bolt Case. Illustrated.....	41
Reisch's Foot Power Emery Wheel No. 2. Illustrated.....	41
Nassau Design. Illustrated.....	41
Corn Sheller and Grinder Combined. Illustrated.....	42
Guardian Cash Register for Domestic and Foreign Use. Illus.	42
Improved Star Safety Razor. Illustrated.....	43
The Hercules Cutting Nipper. Illustrated.....	43
Art Hardware. Illustrated.....	44
Royal Lather Brush. Illustrated.....	44
Current Hardware Prices.....	45
Current Metal Prices.....	45

# Current Hardware Prices.

REVISED AUGUST 21, 1900.

**General Goods.**—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. They apply to such quantities of goods as are usually purchased by retail merchants. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

**Special Goods.**—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

**Adjusters Blind—**  
Domestic,  $\frac{1}{2}$  doz. \$8.00.....\$8.00@10%  
North's.....10%

Zimmerman's—See Fasteners, Blind.

**Window Stop—**

Ives' Patent.....25@5%

Taplin's Perfection.....50%

**Ammunition—** See Caps, Cartridges, Shells, &c.

**Anvils—American—**

Eagle Anvils.....\$ 7 1/2@7 1/2%  
Hay-Budden, Wrought.....9 1/2@9 1/2%  
Horseshoe brand, Wrought.....9 1/2@9 1/2%  
Samson.....\$ 7 1/2@8 1/2%

Trenton, Wrought.....\$ 8 1/2@8 1/2%

Buel Pat. Trenton Wrought.....\$ 9@9 1/2%

Vulcan Wrought.....\$ 8 1/2@8 1/2%

**Imported—**

Armitage's Mouse Hole.....8 1/2@9 1/2%

Peter Wright's.....9 1/2@9 1/2%

**Anvil, Vise and Drill—**

Millers Falls Co., \$18.00.....20%

**Apple Parers—** See Parers, Apple, &c.

**Aprons, Blacksmiths'—**

Hull & Hoyt Co.:  
Lots of 1 doz.....25%

Smaller Lots.....30%

Lots of 3 doz.....30%

**Augers and Bits—**

Common Double Spur, 60¢@10¢@70%  
Boring Machine Augers.....60¢@10¢@70%

Car Bits, 12-in. twist.....60¢@10¢@70%

Jennings' Pattern:.....60¢@10¢@70%

Auger Bits.....60¢@10¢@70%

Ford's Auger and Car Bits.....40¢@10¢@40¢@10¢@70%

Forstner Pat. Auger Bits.....25¢

C. E. Jennings & Co.:  
No. 10 ext. lip, R. Jennings' list.....40¢

No. 80, R. Jennings' list.....50¢

Russell Jennings'.....25¢@10¢@70%

L'Hommedieu Car Bits 15¢@10¢@70¢@70%

Pugh's Black.....20%

Pugh's Jennings' Pattern.....35¢

Snell's Auger Bits.....60¢

Snell's Bell Hangers' Bits.....50¢

Snell's Car Bits, 12-in. twist.....60¢

Wright's Jennings Bits (R. Jennings' list).....50¢

**Bit Stock Drills—**

Standard List.....65¢@65¢@70%

**Expansive Bits—**

Clark's small, \$18; large, \$25.....50¢@10¢

Lavigne's Clark's Pattern, No. 1,  $\frac{1}{2}$  doz. \$25; No. 2, \$18.....50¢@10¢

C. E. Jennings & Co., Steer's Pat.....50¢@10¢

Swan's.....60¢

**Gimlet Bits—**

Common Double Cut, gro. \$2.75@3.50

German Pattern.....gro. \$5.00@5.50

Double Cut, makers' lists.....60¢@5@50¢@10¢

**Hollow Augers—**

Ames.....25@10¢

Bonney's Adjustable,  $\frac{1}{2}$  doz. \$16.00

New Patent.....25@10¢

Universal.....20%

**Ship Augers and Bits—**

Ford's.....40¢

Snell's.....40¢

C. E. Jennings & Co.:  
L'Hommedieu's.....15¢@10¢

Watrous'.....40¢

**Awl Hafts, See Hafts, Awl.**

**Awls—**

Brad Awls:  
Handled.....gro. \$2.75@3.50

Unhandled, Shouldered, gro. 65¢@70¢

Unhandled, Patent.....gro. 60¢@70¢

Peg Awls:  
Unhandled, Patent.....gro. 51¢@5¢

Unhandled, Shouldered, gro. 65¢@70¢

Scratch Awls:  
Handled, Common, gro. \$3.50@4.00

Handled, Socket, gro. \$11.50@12.00

**Awl and Tool Sets—** See Awl and Tool.

**Axes**

First Quality, best brands, \$6.25@6.50

First Quality, other brands, \$6.00@6.25

Jobbers' Special Brands:

Good Quality.....\$5.00@5.50

Best Quality.....\$6.25

Cheap, Handled Axes.....\$5.50@5.75  
Bevelled, add 25¢ doz.

**Axle Grease—** See Grease, Axle.

**Axes—**

Iron, Steel.

No. 1 Common.....4¢ c 3/4¢

No. 1 1/2 Com. New Style, 4 1/2¢ 4 1/2¢

No. 2, Solid Collar.....4 1/2¢ 4 1/2¢

No. 7, 8, 11 to 14, 80¢@10¢

No. 8, 11 to 14, 100 sets.....70¢

No. 15 to 18.....80¢

No. 19 to 22.....70¢@10¢

**Boxes, Axle—**

Common and Concord, not turned.....15¢

Common and Concord, turned.....lb. 6¢

Half Patent.....lb. 9¢

**Balances—**

Sash—

Caldwell new list.....50¢

Pullman's.....60¢

**Spring—**

Spring Balances.....50¢@50¢@5%

Chatillon's Light Spz. Baances.....40¢@10%

Chatillon Straight Balances.....40¢

Chatillon Circular Balances.....50¢

Chatillo's Large Dial.....50¢

Postouze.....50¢

**Barb Wire—** See Wire, Barb.

**Bars—** Crow—

Steel Crowsbars, 10 to 40 lb., per lb.....5¢@3/4¢

**Beams, Scale—**

Scale Beams, List Jan. 12, '98.....30¢@30¢@5%

Chatillon's No. 1.....30¢

Chatillon's No. 2.....40¢

**Beaters—** Egg—

Standard Co.:  
No. 5 Steel Handle Dovr. # gro. \$6.50

No. 10 Cast Handle Dovr. # gro. \$8.00

No. 10 Steel Handle Dovr. # gro. \$8.00

No. 15 Extra Heavy Steel Handle.....\$15.00

Rival, # gro. \$14.00

Taplin Mfg. Co.:  
No. 50 Small Family size.....50¢

No. 100 Regular Family size.....60¢

No. 102 Regular Family size, tinned.....50¢

No. 150 Large Family size.....\$15.00

No. 152 Large Family size, tinned.....\$17.00

Lyon's Standard size.....\$10.00

Wonder (S. S. & Co.).....\$10.00

**Belows—**

Blacksmith, Standard List, 70¢@70¢@5%

C. E. Jennings & Co., Blacksmith, 60¢@10¢@70%

C. E. Jennings & Co., Hand.....55¢@5%

**Blacksmiths—**

Inch... 30 33 36 38 39 40

Each... \$2.70 3.95 4.55 5.10 5.70 6.55

Extra Length:

Each... \$4.35 4.85 5.40 5.95 6.50 7.95

**Molders—**

Inch... 9 10 11 12 14 16

Doz... \$6.75 7.25 8.50 9.50 12.00 14.50

**Hand—**

Inch... 6 7 8 9 10 12

Doz... \$3.75 4.25 4.50 5.00 5.75 6.75

**Bells—** Cow—

Ordinary goods.....75¢@10%

High grade.....70¢@70¢@10%

Jersey.....75¢@75¢@10%

Texas Star.....50¢@10%

**Miscellaneous—**

Farm Bells.....lb. 2@3/4¢

Steel Alloy Church and School.....50¢@10¢@80%

Wilmot & Hobbs Mfg. Co., Gongs.....70¢

**Rubber—**

Common Standard.....70¢@10¢@75%

Standard.....60¢@10¢@70%

Extra.....60¢@80¢@10%

High Grade.....60¢@80¢@10%

**Leather—**

Extra Heavy, Short Lap.....60¢@10¢@80¢@5%

**Cut Prices.**—In the present condition of the market there is a good deal of cutting of prices by the jobbing trade, whose quotations are often lower than those of the manufacturers.

**Names of Manufacturers.**—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE INDEX SUPPLEMENT (May 8, 1900), which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

**Standard Lists.**—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

**Additions and Corrections.**—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

**Borers, Tap—**

Borers Tap, Ring, with Handle:

Inch.....1/4 1/2 1 1/4 1 1/2 2 1/2 3

Per doz. .... \$3.00 4.50 5.00 5.50 6.50

Inch.....1/4 1/2 1 1/4 1 1/2 2 1/2 3

Per Doz. .... \$7.50 10.25

Enterprise Mfg. Co. No. 1, \$1.25; No. 2, \$1.65; No. 3, \$1.80 each. .... 20¢@30¢

**Boring Machines—** See Machines, Boring.

**Boxes, Mitre—**

C. E. Jennings & Co. .... 40¢

Seavey's, per doz., \$30. .... 40¢

**Braces—**

Note.—Most Braces are sold at net prices.

Common Ball, American.....\$1.10@1 1/2

Barber's.....80¢@10¢@10¢@10%

Fray's Genuine Spofford's.....80¢@10¢@10%

Fray's No. 70 to 120, 81 to 125, 207 to 414. .... 50¢@10¢@10%

C. E. Jennings & Co. .... 50¢@10¢

F. S. & W. Co., Peck's Patent. .... 50¢@10¢@10%

**Brackets—**

Cast Iron, plain.....60¢@10¢@70¢@10%

Wrought Steel.....70¢@70¢@10%

Bradley's Wire Shelf:

Full cases ..... 80¢

Broken cases ..... 75¢@10¢

**Bright Wire Goods—** See Wire and Wire Goods.

**Brollers—**

Wire Goods Co. .... 70¢@70¢@10%

**Buckets, Well and Fire—**

See Pails

**Bucks, Saw—**

Hoosier. .... 1¢ gro. \$36.00

**Bull Rings—** See Rings, Bull.

**Butts—** Brass—

Wrought list Sept. '96. .... 35¢@10¢@35¢

Cast Brass, Tiebout's. .... 50¢

**Cast Iron—**

Fast Joint, Broad. .... 50¢@10¢

Fast Joint, Narrow. .... 50¢@10¢

Loose Joint. .... 60¢@60¢@10¢@10%

Loose Pin. .... 60¢@60¢@10¢@10%

Loose Pin, Ball, and. .... 60¢@60¢@10¢@10%

**Cast Iron—**

Brunt. .... 50¢@10¢@10¢@10%

Blunt. .... per lb. 4¢@4¢

Perkins' Blunt. .... 50¢@10¢@10¢

Perkins' Sharp. .... 50¢@10¢@10¢

**Can Openers—** See Openers, Can.

**Cans, Milk—**

Illinois Pattern. .... \$1.75 2.10 2.50 3 gal. .... 5¢@10¢@10¢@10¢

Iowa Pattern. .... 2.40 2.60 2.80 3 gal. .... 5¢@10¢@10¢@10¢

Buffalo Pattern. .... 2.20 2.50 2.80 3 gal. .... 5¢@10

**Carpet Stretchers—**

See Stretchers, Carpet.

**Cartridges—**

B. B. Caps, Con., Ball Swg.	\$1.90
B. B. Caps, Round Ball	\$1.12@1.18
Blank Cartridges:	
22 C. F., \$5.50	10¢ 5¢
22 C. F., \$7.00	10¢ 5¢
22 cal. Rim, \$1.50	10¢ 5¢
22 cal. Rim, \$2.75	10¢ 5¢
Central Fire	2¢
Pistol and Rifle	15¢ 5¢
Primed S.ells and Bullets	15¢ 5¢
Rim Fire Sporting	.50¢
Rim Fire, Military	15¢ 5¢

**Casters—**

Bed	60¢ 10¢@10¢ 70¢
Plate	.60¢ 10¢@60¢ 10¢ 5¢
Philadelphia	70¢ 10¢@70¢ 10¢ 10¢
Boss	.70¢ 10¢
Martin's Patent (Phoenix)	.45¢
Payson's Anti-friction Furniture	.70¢ 10¢
Payson's Anti-friction Truck	.70¢ 10¢
Standard Ball Bearing	.45¢
Tucker's Patent, low list	.30¢

**Cattle Leaders—**

See Leaders, Cattle.

**Chain—**

American Coil, Full Casks:	
3-16 4-5-16 3-4 7-16 3-4 9-16	
7-16 5-35 4-35 3-35 3-25 3-15	
6-6 3-4 3-4 to 1-1/4 in.	
3-10 3-05 5.00 cents per lb.	
Less than Cask lots add 10¢ per 100 lbs.	
German Coil, list July 28, '97	.60¢ 10¢@10¢

German Halter Chain, list July 28, '97

Traces, Western Standard: 100 pair

6-8-3, Straight, with ring, \$26.00

6-8-2, Straight, with ring, \$27.00

6-8-2, Straight, with ring, \$31.00

6-8-2, Straight, with ring, \$35.00

Add 2¢ per pair for Hooks.

Twist Traces 2¢ per pair higher than Straight Link.

Trace, Wagon and Fancy Chains, list April, '98

Jack Chain, list July 10, '98

Iron, .60¢@60¢ 10¢

Brass, .60¢@60¢ 10¢

Safety Chain, .60¢@60¢ 10¢

Gal. Pump Chain, lb. 50¢ 1/4¢

Covert Sea Works:

Breast, Hitching and Rain Chains, .50¢

Covert Mfg. Co.:

Breast, .35¢ 2¢

Halter, .35¢ 2¢

Heel, .35¢ 2¢

Hein, .35¢ 2¢

Stallion, .35¢ 2¢

Oneida Community:

Eureka Coil and Halter, .60¢@60¢ 2¢

Niagara Coll and Halter, .60¢@60¢ 2¢

Niagara Cow Ties, .45¢@45¢@80¢@10¢

Am. Coll and Halters, .50¢@10¢@5¢@60¢

Am. Cow Ties, .35¢@40¢@25¢

Wire Goods Co.:

Dog Chain, .60¢

Universal Dbl-Jointed Chain, .60¢

Chalk—(From Jobbers)

Carpenters, Blue, .gro. 45¢

Carpenters, Red, .gro. 35¢

Carpenters, White, .gro. 30¢

See also Crayons.

Chalk Lines—See Lines.

Checks, Door—

Bardsley's, .40¢@10¢

Columbia, .50¢@10¢

Eclipse, .60¢@60¢@10¢

Chests, Tool—

American Tool Chest Co.:

Boys' Chests with Tools, .55¢

Youth's Chests, with Tools, .60¢

Gentlemen's Chests, with Tools, .65¢

Youth's Chests, Empty, .50¢

Gentlemen's Chests, Empty, .55¢

C. E. Jennings &amp; Co.'s Machinists' Tools, .60¢@10¢

Chests, .35¢@40¢@10¢

Chisels—

Socket Framing and Firmer

Standard List, .70¢@75¢@25¢

Buck Bros., .30¢

Charles Buck, .30¢

C. E. Jennings &amp; Co. Socket Firmer, No. 10, .60¢@10¢

C. E. Jennings &amp; Co. Socket Framing, No. 15, .60¢@10¢

Swan's, .70¢@10¢

L. &amp; L. J. White, .30¢@30¢@35¢

Tanged—

Tanged Firmers, .60¢@5¢@40¢@10¢

Buck Bros., .30¢

Charles Buck, .30¢

C. E. Jennings &amp; Co. Nos. 10, 18, .25¢

L. &amp; L. J. White, Tanged, .25¢

Cold—

Cold Chisels, good quality, lb. 14@16¢

Cold Chisels, fair quality, lb. 12¢

Cold Chisels, ordinary, lb. 8@9¢

Chucks—

Beach Pat. each \$8.00, .90¢

Skinner Patent Chucks, .40¢

Combination Lathe Chucks, .40¢

Drill Chucks, Patent and Standard, .30¢

Drill Chucks, New Model, .2¢

Independent Lathe Chucks, .40¢

Improved Planer Chucks, .20¢

Universal Lathe Chucks, .40¢

Face Plate Jaws, .35¢

Standard Tool Co.:

Improved Drill Chuck, .45¢

Union Mfg. Co.:

Combination, .40¢

Czar Drill, .30¢

Geared Scroll, .30¢

Independent, .30¢

Union Drill, .30¢

Universal, .30¢

Face Plate Jaws, .35¢

Champs—

Adjustable, Hammers, .20@20¢@5¢

Adjustable, Stearns', .30¢

Cabinet, Sargent's, .45¢@10¢

Carriage Makers', P. S. &amp; W. Co., .40@10¢

Carriage Makers', Sargent's, .50¢@10¢

Besly, Parallel, .33¢@10¢

Linemans, Utica, Drop For. &amp; Tool Co., .40¢

Saw Clamps, see Vises, Saw Miers.

**Cleaners Walk—**

Star Socket, All Steel, #	doz. \$4.00 net
Star Shank, All Steel, #	doz. \$3.75 net
W. & Co. Spank, All L. & T. 7/8 in. #	doz. \$3.50, 8 in. \$3.40; 8 1/4 in. \$3.50.
Postor Bros.	
Chicago Flexible Shaft Company	
Handy Toilet	doz. \$7.30
Mascotte Toilet	doz. \$8.40
Monito Toilet	doz. \$9.00
Stewart's Patent	doz. \$10.00

**Cleavers, Butchers'—**

Postor Bros.	doz. \$3.00
Chicago Flexible Shaft Company	
Handy Toilet	doz. \$7.30
Mascotte Toilet	doz. \$8.40
Monito Toilet	doz. \$9.00

**Clips, Axe—**

Eagle and Superior	4 and 5-1/2 in.
inch	70¢@10¢
each	10¢@10¢
each	10¢@10¢
each	10¢@10¢

**Clips, Axle—**

Eagle and Superior	4 and 5-1/2 in.
inch	70¢@10¢
each	10¢@10¢
each	10¢@10¢
each	10¢@10¢

**Clips, Axe—**

Eagle and Superior	4 and 5-1/2 in.
inch	70¢@10¢
each	10¢@10¢
each	10¢@10¢
each	10¢@10¢

**Clips, Axe—**

Eagle and Superior	4 and 5-1/2 in.
inch	70¢@10¢
each	10¢@10¢
each	10¢@10¢
each	10¢@10¢

**Clips, Axe—**

Eagle and Superior	4 and 5-1/2 in.
inch	70¢@10¢
each	10¢@10¢
each	10¢@10¢
each	10¢@10¢

**Clips, Axe—**

Eagle and Superior	4 and 5-1/2 in.
inch	70¢@10¢
each	10¢@10¢
each	10¢@10¢
each	10¢@10¢

**Clips, Axe—**

Eagle and Superior	4 and 5-1/2 in.
inch	70¢@10¢
each	10¢@10¢
each	10¢@10¢
each	10¢@10¢

**Clips, Axe—**

Eagle and Superior	4 and 5-1/2 in.
inch	70¢@10¢
each	10¢@10¢
each	10¢@10¢
each	10¢@10¢

**Clips, Axe—**

Eagle and Superior	4 and 5-1/2 in.
inch	70¢@10¢
each	10¢@10¢
each	10¢@10¢
each	10¢@10¢

**Clips, Axe—**

Eagle and Superior	4 and 5-1/2 in.
inch	70¢@10¢
each	10¢@10¢
each	10¢@10¢
each	10¢@10¢

**Clips, Axe—**

Eagle and Superior	4 and 5-1/2 in.
inch	



**Bull's Eye Police—**

2½-inch flash light, doz. \$3.50@3.75  
3-inch flash light, doz. \$4.00@4.25  
2½-inch regular, doz. \$3.25@3.50  
3-inch regular, doz. \$3.50@3.75

**Latches, Thumb—**

Roggan's Latches, doz. \$2@3.50

**Lawn Mowers—**

See Mowers, Lawn.

**Leaders, Cattle—**

Small, doz. 45c; large, 55c  
Cover Mfg. Co. 45c@2%

**Lemon Squeezers—**

See Squeezers, Lemon.

**Lifters, Transom—**

Dickson: 3 x 4 ft. x 4, \$100 \$11.00  
Other sizes, Iron, 70c@80c

Other size, Brass and Bronze, 70c

Excelsior, 60@60@10c

Paysor's: Solid Grip Nos. 648 and 644, 1.00

Bronzed Iron, 70c

**Lines—**

Wire Clothes, Nos. 18 19 20  
100 feet, \$3.90 2.50 1.95

75 feet, \$3.15 1.90 1.65

Ossawam Mills: Crown Solid Braided Chalk, .33c@3c

Mason's, No. 0 to No. 5, .33c@3c

Samson Cordage Works: Solid Braided Chalk, No. 0 to 3, 40c

Silver Lake Braided Chalk, No. 0, \$0.00; No. 1, \$0.50; No. 2, \$7.00; No. 3, \$7.50

W. gr., 30c

**Locks, &c.— Cabinet—**

Cabinet Locks, \$3.50@3.50@7.50

Door Locks, Latches, &c.—

[Net prices are very often made on these goods.]

Reading Hardware Co., 40c

R. & E. Mfg. Co., 50c

Sargent & Co., 40c@40c@10c

Slaymaker-Barry Co., 30c@35c

Snow's Victor, 50c@10c

**Elevator—**

Stowell's, \$3.50

**Padlocks—**

Wrought Iron, list Dec. 3, '97, 70@70@10c

Dog Collar, S. B. Co., 40c

R. & E. Mfg. Co. Wrt. Steel and Brass, 50c

W. B. & Co., 40c

**Sash, &c.—**

Fitch's Bronze and Brass, 65c@2

Fitch's Iron, 70c

Ives' Patent, 55c@50c@65c

Oefinger's Automatic, 50c

Payson's Perfect, 70c

Payson's Signal (new list), 75c

Reading, 60@10@10@70c

**Machines—**

**Boring—**

Without Augers, Upright, Angular.

Improved No. 3, \$4.25 No. 1, \$5.00

Improved No. 4, 3.75 No. 2, 3.38

Improved No. 5, 2.75

Jenning's, 2.50 8.00

Millers' Falls, 5.75

Snell's, Rice's Pat. 2.50 2.75

Swan's, No. 500, 5.10 No. 200 6.45

**Hoisting—**

Moore's Anti-Friction Differential Pulley Block, 30c

Moore's Hand Hoist, with Lock Brake, 20c

**Ice Cutting—**

Chandler's, 15c

**Washing—**

Wayne American, \$100@28.00

Western Star, No. 2, \$100@28.00

Western Star, No. 3, \$100@28.00

St. Louis, No. 4, \$100@28.00

**Mallets—**

Hickory, 45c@50c@55c

Lignumvita, 45c@50c@55c

Tinners', Hickory and Applewood, doz., \$0.50

Fiber Head Stearns', 30c@10c

**Mats—**

Door—

Elastic Steel, (W. G. Co.), 10c

**Mattocks—**

See Picks and Mattocks.

**Meat Cutters—**

See Cutters, Meat.

**Milk Cans—** See Cans, Milk

**Mills—** Coffee—

Box and Side, list Jan. 1, '88, 50c@10c@5@60c@55c

Net prices are often made on some goods which are lower than above discounts.

Enterprise Mfg. Co., 25@30c

National, list Jan. 1, '94, 30c

Parker's Columbia and Victor, 50c@10c@60c

Swift, Lane Bros., 30c

**Mincing Knives—**

See Knives, Mincing.

**Molasses Gates—**

See Gates, Molasses.

**Money Drawers—**

See Drawers, Money.

**Mowers, Lawn—**

Net prices are generally quoted.

Cheap, all sizes, \$2.00

Good, all sizes, \$2.50@2.75

10 12 14 16-inch

High Grade 4.25 4.59 6.75 8.00

Pennsylvania and Continental 60@10c@5c

Quaker City, 70c@5c

Great American, 70c@5c

**Philadelphia:**

Styles M., S. C. K. T., 70@10c  
Style A, all Steel, 60@10c  
Style E, Low Wheel, 60@10c  
Style E, High Wheel, 50@10c  
Drexel and Gold Coin, low list, 50c

**Nails—**

Cut and Wire. See Trade Report.

Wire Nail and Brads, Papered.

List July 20, 1899, 85@5c@10c

Hungarian, Finishing, Upholsterers, &c. See Tacks

**Horse—**

Nos. 6 7 8 9 10  
A. C. 25c 23c 22c 21c 21c

Capewell, 19c 18c 17c 16c 16c@10c  
C. B. K. 25c 25c 22c 21c 21c@10c

Champlain, 28c 26c 25c 24c 23c

Maud S., 25c 23c 22c 21c 21c@10c

Neponset, 23c 21c 20c 19c 18c@10c

Putnam, 23c 21c 20c 19c 18c@10c

Standard, 23c 21c 20c 19c 18c@10c

Star, 23c 21c 20c 19c 18c@10c

Vulcan, 23c 21c 20c 19c 18c@10c

25c@10c

**Picture—**

1½ 2 2½ 3 3½ in.

Brass Head, 4.50 .70 .95 1.00 gro.

For Head, 1.10 1.10 1.10 .90 gro.

**Nippers, See Pliers and Nippers.**

**Nut Crackers—**

See Crackers, Nut.

**Nuts—**

List Feb. 1, '99.

Cold Punched

Mfrs. or U. S. Standard, list.

Hexagon, plain, 4.40@4.50c

Square, plain, 3.50@4.00c

Square, C. T. & R., 4.10@4.20c

Hexagon, C. T. & R., 4.70@4.80c

Hot Pressed:

Mfrs., U. S. or Nar. Gauge Stan'd.

Square, .50@.55@.50c

Hexagon, .50@.55@.50c

NOTE.—Tapped Nuts are now 2-10c higher than above.

**Oakum—**

Best or Government, lb. 6½c

Navy, .50 c

S. Navy, .50 c

Plumbers' Spun Navy, .5 c

In carload lots 3½ c lb. off f.o.b. New York.

**Oil, Axle—**

Snow Flake:

1 pt. cans, per doz. \$3.00

1 qt. cans, per doz. \$4.80

1 gal. cans, per doz. \$15.00

5 gal. cans, per doz. \$68.00

**Oil Tanks—** See Tanks, Oil.

**Oilers—**

Brass and Copper, 10@10@50c

Tin or Steel, 60@10@65c

Zinc, 60@10@65c

Malleable, Hammers' Improved, No. 1, \$4.00; No. 2, \$4; No. 3, \$4.40 per doz. 20c

Malleable, Hammers' Old Pattern, same list, 50@10c

Wilmot & Hobbs Mfg. Co., 70@70@10c

**Openers—****Can—**

French, doz. 55c

Iron Handle, doz. 25@27c

Sprague, Iron Handle, per doz. 55@50c

Sardine Scissors, doz. \$1.75@2.50

Tip Top, per doz. \$0.75

National, \$0.75

Stowell's, per doz. 40@45c

**Egg—**

Nickel Plate, per doz. \$2.00

Silver Plate, per doz. \$4.00

**Packing—**

**Rubber—**

Standard, fair quality, 70@10@75c

Inferior quality, 75@10@80c

Extra, 80@10@80c@10c

Jenkins' Standard, \$0.80c, 25@25c@5c

Miscellaneous—

American Packing, 9@10c lb.

Cotton Packing, 15@15c lb.

Italian Packing, 10½@11½c lb.

Jute, 5@5½c lb.

Russia Packing, 12@13c lb.

**Pails—****Creamery—**

S. S. & Co., with gauges, No. 1, \$6.50;

No. 2, \$8.75 per doz.

**Galvanized—**

Price per gro.

Inch, 10 12 14 16

Water, Regular, 15.00 21.00 26.00

Water, Heavy, 22.00 26.00 26.00

Fire, Ed. Bottom, 31.00 35.00 35.00

Well, 27.00 39.00 31.00

**Dripping—**

Standard List, 60@80c@5c

Fry—

Standard List, 75@10@80c

**Roasting and Baking—**

Regal, S. S. & Co., \$0. doz. Nos. 5, \$4.50;

10 \$5.00; 20 \$5.50; 30 \$6.00

Simplex, \$0. gro., No. 40, \$30.00; 50, \$45.00; 60 \$39.00; 140, \$39.00; 150, \$37.50; 160, \$43.00

**Pans—**

**Plates—**

Fellow, 1b. 4½@4½c

Self-Sealing Pie Plates (S. S. & Co.), \$0. doz. \$9.00

50c

**Pliers and Nippers—**

Button Pliers, 65@10@70@10½

Gas Burner, per doz., 5 in., \$1.15@

\$1.20; 6 in., \$1.35@1.45

Gas Pipe, 7 8 10 12-in.

\$1.75 \$1.00 \$2.75 \$3.75

**Pliers and Nippers—**

Crown, \$0. doz. \$12.00

Crown Prince, \$0. doz. \$15.00

Cyclops, \$0. doz. \$12.00

Lodi Pliers, \$0. doz. \$12.00

Elm City Fence Pliers, \$0. doz. \$12.00

Cronk Hanger Co., \$0. doz. \$12.00

Improved Button, \$0. doz. \$12.00

Paragon Pliers, \$0. doz. \$12.00

Lodi Pliers, \$0. doz. \$12.00

Ella City Fence Pliers, \$0. doz.



**Shovels and Tongs—**

Brass Head.....60¢<sup>5</sup>50@80¢10%  
Iron Head.....60¢<sup>5</sup>50@80¢10%

**Sieves and Sifters—**

Hunter's Imitation, gro. \$11.00@12.00  
Buffalo Metallic Blued, S. S. & Co., 2 gr.:  
14x16 16x18 18x20  
\$12.90 \$13.80 \$15.00  
Eclipse.....2 gr. \$10.00  
Electric Light.....2 gr. \$12.00  
Hunter's Genuine.....2 gr. \$12.50  
Shaker (Barler's Pat.) Flour Sifters,  
2 doz. \$2.00.....30¢

**Sieves, Wooden Rim—**

Nested, 10, 11 and 12 Inch.  
Mesh 18, Nested, doz.....60¢75@87¢  
Mesh 20, Nested, doz.....85¢90@105  
Mesh 24, Nested, doz.....100¢105

**Sinks—**

Cast Iron—  
Standard list.....60@80¢10%  
Note.—There is not entire uniformity  
in lists used by jobbers.

**Wrought Steel—**

Columbus Galv'd and Enamelled.....80¢5%  
Columbus, Painted.....45¢  
L. & G. Mfg. Co., Galvanized.....50¢  
L. & G. Mfg. Co., Enamelled.....50¢

**Skeins, Wagon—**

Cast Iron.....70@70¢10%  
Malleable Iron.....40¢10@50¢  
Steel.....35@35&5%  
I. & B. Co. Steel.....35¢

**Slates—**

"D" Slates.....50¢10@50¢10¢10%  
Unexcelled Noiseless Slates.....  
60¢65 tens@60¢65 tens@5%

Wire Bound.....40¢10@50¢  
Double Slates, add \$1 case, net.

**Slaw Cutters—See Cutters.**

Slicers, Vegetable—  
Sterling \$2.00.....33¢5%

**Snaps, Harness—**

German.....40@40¢10%  
Cover Mfg. Co.:  
Derby.....35¢25  
High Grade.....45¢25  
Jockey.....40¢25  
Trojan.....45¢25

Cover's Saddlery Works:  
Banner.....60¢105  
Crown.....60¢105  
Triumph.....60¢105

W. & T. Fitch Co.:  
Bristol.....40¢105  
Empire.....50¢55  
German.....40¢  
National.....50¢25  
Perfect.....40¢  
Clipper.....50¢25  
Clipper.....40¢  
Champion.....40¢  
Victory.....40¢  
Victor.....50¢25

Oneida Community:  
Solid Steel.....65¢65@10%  
Solid Swivel.....65¢10@45¢10@10%  
Sargent's Patent Guarded.....60¢10@10%

**Snaths—**

Scythe.....45¢5%  
Snips, Tinnings'—See Shears.

**Soldering Irons—**

See Irons, Soldering.

**Spoke Trimmers—**

See Trimmers, Spoke.

**Spoons and Forks—**

Silver Plated—  
Flat Ware.....50¢10@60¢10%  
Wm. Rogers Mfg. Co.....50¢10%

**Miscellaneous—**

German Silver.....60¢10%  
Wm. Rogers Mfg. Co.:  
18% German Silver.....60¢  
Rogers' Silver Metal.....50¢10%

**Springs—**

Door—  
Gem (Coll).....20¢  
Star (Coll).....30¢  
Torrey's Rod, 39 in. 2 doz. \$1.10@1.25  
Warner's No. 2, 2 doz. \$2.50; No. 3,  
\$3.00.....60¢10@10%

Victor (Coll).....50¢10@10%

**Carriage, Wagon, &c.**

Factory Shipments,  
1 1/4 in and wider, Blk. Hf. Bt. Bt.  
4 1/4 4 1/4 4 1/4 lb

Cliff's Bolster Springs.....35¢  
Cliff's Seat Springs.....2 pair 55¢

**Sprinklers, Lawn—**

Enterprise.....25@30¢  
Philadelphia No. 1, 2 doz. \$12; No. 2,  
\$15; No. 3, \$24.....30¢

**Squares—**

Nickel plated.....List Jan. 5, 1900  
Steel and Iron.....70¢@...\$5  
Rosewood Hdl. Try Square and T-  
Bevels.....80¢100¢10%  
Iron Hdl. Try Squares and T-Bevels,  
40¢10@40¢10@10%

Diston's Try Sq. and T-Bev ls.....60¢10%  
Winterbottom's Try and Miter.....5¢10¢

**Squeezers—**

Lemon—  
Wood, Common, gro., No. 9, \$5.25  
\$4.50; No. 1, \$6.25@6.50.  
Wood, Porcelain Lined:  
Cheap.....doz. \$2.00@2.75  
Good Grade.....doz. \$5.00@5.50

**Tinned Iron—**

Iron, Porcelain Lined doz. \$2.90@3.25

Jennings' Star.....2 doz. \$1.85@1.90

Klug.....2 doz. \$2.00

Barbed Blind.....lb. 8 1/4@9 1/4¢

Electricians' Association list, 75¢10%  
Fence Staples, same price as Barbed  
Wire. See Trade Report.

Poultry Netting, Staples, per lb. 5¢.

Grand Crossing Tack Co.'s list, 8¢10¢

Dick's.....40¢  
Foster Bros.....30¢  
C. & A. Hoffmann's.....40¢  
Nichols Bros.....50¢

Steels, Butchers'—

Blacksmiths'.....40@40¢10%  
Gardner Die Stocks No. 1, 50¢  
Gardner Die Stocks, larger sizes, 40¢  
Green River.....25¢  
Lightning Screw Plate.....25¢  
Little Giant.....25¢  
Reece's New Screw Plates.....25¢30¢  
Curtis Reversible Ratchet Die Stock, 25¢

Stone—

Scythe Stones—

Pike Mfg. Co., list '95-'96.....33¢4¢

Cleveland Stone Co., list Nov. '92, 33¢4¢

Oil Stones, &c.—

Pike Mfg. Co.:

Hindostan No. 1, 2 lb. 8¢

Sand Stone.....5¢

Turkey Oil Stone, Extra.....33¢4¢

5 to 3 in. 30¢

Turkey Slips.....\$1.50

Lily White Washita.....60¢

Rosy Red Washita.....60¢

Washita Stone, Extra.....50¢

Washita Stone, No. 1, 40¢

Lily White Slips.....90¢

Rosy Red Slips.....90¢

Washita Slips, Extra.....80¢

Washita Slips, No. 1, 70¢

Arkansas Stone, No. 1, 3 to 5 in., \$2.50

Arkansas Stone, No. 1, 5 to 8 in., \$1.50

India Oil Stones.....25¢

Tanite Mils.....

Emery Oil, 2 doz. \$3.00.....50¢60¢

Stoners—

Cherry—

Enterprise.....25@30¢

Stops, Bench—

Millers Falls.....15@10¢

Morrill's, 2 doz. No. 1, \$10.00; No. 2,  
\$11.00, 40¢20¢

Stops, Window—

Ives' Patent.....25¢5%

Wilcox, Steel, per doz., \$0.00.....50¢

Stove Boards—

See Boards, Stove.

Stove Polish—See Polish, Stove.

Strainers, Pump—

Diamond Joe Pump Strainers, per doz. 75¢

Straps, Box—

Cary's Universal case lots.....20@10¢

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 55@65¢

Cast Steel, Polished.....doz. 32.25

Socket.....doz. \$1.75

Stuffers, Sausage—

Miles' Challenge, 2 doz. \$2.00@50¢5%

Enterprise Mfg. Co., 2 doz. \$2.00@75¢

National Specialty Mfg. Co., list Jan.  
1, '97.....50¢

Tacks, Brads, &c.—

See Trade Report.

List Jan. 15, '99.

American Cut Tacks.....90¢40@...%

Swedes Iron Tacks.....90¢40@...%

Swedes Upholsterers' Tacks.....

90¢40@...%

Gimp Tacks.....90¢40@...%

Lace Tacks.....90¢40@...%

Trimmers' Tacks.....90¢30@...%

Looking Glass Tacks.....70¢10@...%

Bill Posters and Railroad Tack-  
90¢40@...%

Common and Patent Brads, 70¢10@...%

Trunk and Clout Nails, 80¢10@...%

Note.—The above prices are for  
straight Weights. An extra 5¢ is given  
for Star Weights, and an extra 10¢ on  
Standard Weights.

Miscellaneous—

Double Point Tacks.....90¢7 or 8 tens

Steel Wire Brads, R. & E. Mfg.  
Co., list.....50¢10@10¢

See also Nails, Wire.

Tanks, Oil—

Emerald, S. S. & Co.....30-gal. \$3.20

Emerald, S. S. & Co.....60-gal. \$4.00

Queen City S. S. & Co., 60-gal. \$3.50

Queen City S. S. & Co., 60-gal. \$4.25

Chesterman's.....25¢5¢5¢5

Tapes, Measuring—

American Asses' Skin.....40¢10@50¢

Porcelain Leather.....15¢20¢5¢

Steel.....50¢@6¢5¢

Chesterman's.....25¢5¢5¢5

India 2-Ply Hemp, 1/4 and 1/2 lb. Balls.....10¢

India 3-Ply Hemp, 1/4-lb. Balls.....10¢

India 5-Ply Hemp, 1/2-lb. Balls.....10¢

**THE IRON AGE****Tinned Iron—**

Eddy's Steel.....40@40¢5¢

Eddy's Metallic.....33¢4¢33¢4¢5¢

Keufel & Esser Co., Steel and Metallic  
Lower list, 1890.....35¢

Lufkin's Steel.....33¢4¢33¢4¢5¢

Lufkin's Metallic.....30¢30¢5¢

Thermometers—

Tin Case.....80@50¢10¢

Ties, Bale—Steel.

Standard Wire.....50¢10¢5¢

Staples—

Barbed Blind.....lb. 8 1/4@9 1/4¢

Electricians' Association list, 75¢10%  
Fence Staples, same price as Barbed  
Wire. See Trade Report.

Poultry Netting, Staples, per lb. 5¢.

Grand Crossing Tack Co.'s list, 8¢10¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢

Nichols Bros.....50¢

Steels, Butchers'—

Dick's.....40¢

Foster Bros.....30¢

C. & A. Hoffmann's.....40¢</

<b>Washers—</b>	<b>Weights, Sash</b>
<b>Leather, Axe—</b>	<b>Eastern prices</b> .....\$25.00
<i>Small</i> .....80¢ <del>10¢</del> 10@55¢	<b>Western prices</b> .....\$30.00
<i>Patent</i> .....85¢ <del>85¢</del> 55¢	<b>NOTE.</b> —There is a wide difference in prices East and West, and some Manufacturers are naming lower prices than the above.
<i>Co'd</i> ..... $\frac{3}{4}$ 1 $\frac{1}{4}$ $\frac{1}{2}$ $\frac{1}{4}$ Inch.	
<i>1lb.</i> $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{8}$ $\frac{1}{16}$ per 100	
<b>Iron or Steel—</b>	
<i>Small bolt</i> .....5-16 $\frac{3}{4}$ $\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{4}$	
<i>Washers</i> .....\$5.60 4.70 3.0 3.20 3.00	
<i>In bolts less than one keg add 1/4¢ per lb.</i> 5-lb. boxes add $\frac{1}{2}$ ¢ to list.	
<b>Cast washers—</b>	
<i>Over 1/4 inch, barrel lots</i> .....per lb., 2¢	
<b>Washer Cutters—</b>	
<i>see Cutters, Washer.</i>	
<b>Washing Machines—</b>	
<i>see Machines, Washing.</i>	
<b>Water Coolers—</b>	
<i>see Coolers, Water.</i>	
<b>Weaners—</b>	
<i>Tyler's New Ha'ter—No. 1 \$1 doz. \$3.45; No. 2 \$3.70; No. 3 \$4.00; No. 4 \$4.30</i>	
<i>Tyler's Safety—Nos. 1 and 2, \$1 doz. \$1.70; No. 3, \$2.00; No. 4, \$2.30.</i>	
<b>Wedges—</b>	
<i>Oil Finish</i> .....lb. 3 $\frac{1}{4}$ c	
<i>size Finish</i> .....lb. 4 c	
<b>Weights, Sash</b>	
<b>Eastern prices</b> .....\$25.00	<b>Copper, list Feb. 26, '96</b> .....15¢
<b>Western prices</b> .....\$30.00	<b>Cast Steel Wire</b> .....50¢
<b>NOTE.</b> —There is a wide difference in prices East and West, and some Manufacturers are naming lower prices than the above.	<b>Stubs' Steel Wire</b> .....\$6.00 to £, 40¢
	<b>Wire Clothes Lines, see Lines.</b>
	<b>Wire Picture Cord, see Cord.</b>
<b>Well Buckets, Galvanized</b>	
<i>See Pails, Galvanized.</i>	
<b>Wheels Well—</b>	
<i>8-in., \$1.75@1.85; 10-in., \$2.25@2.35; 12-in., \$2.75@2.85; 14-in., \$4.25@4.40</i>	
<b>Wire and Wire Goods—</b>	
<i>Brt. and Ann., 6 to 9.....70¢<del>10¢</del>10%</i>	<b>Wire Cloth and Netting—</b>
<i>Brt. and Ann., 10 to 18.....72¢<del>10¢</del>5%</i>	<b>Galvanized Wire Netting</b> 30¢ <del>10¢</del> 10¢ <del>5¢</del> 25
<i>Brt. and Ann., 19 to 26.....75¢<del>10¢</del>7½¢</i>	<b>Painted Screen Cloth</b> per 100ft. ....
<i>Brt. and Ann., 27 to 36.....75¢<del>10¢</del>12½¢</i>	<b>1.30@1.40</b>
<i>Cop'd and Galv., 6 to 9.....65¢<del>10¢</del>5%</i>	
<i>Co'd and Galv., 10 to 18.....70¢</i>	<b>Hardware Grade, Iron:</b>
<i>Cop'd and Galv., 19 to 26.....70¢<del>10¢</del>10%</i>	<i>2 to 20 mesh.....sq. ft. 2½@3¢</i>
<i>Cop'd and Galv., 27 to 36.....72¢<del>10¢</del>5½¢</i>	<i>20 to 20 mesh.....sq. ft. 3@3½¢</i>
<i>Tinned, 6 to 11.....70¢<del>10¢</del>5%</i>	<b>Galv. Hardware Grade, 2 to 5 mesh:</b>
<i>Tinned, 15 to 18.....70¢<del>10¢</del>5½¢</i>	<i>sq. ft. 3½@4½¢</i>
<i>Tinned, 19 to 26.....70¢</i>	<b>Galv. Hardware Grade, 6 to 8 mesh:</b>
<i>Tinned, 27 to 36.....65¢<del>10¢</del>10%</i>	<i>sq. ft. 4@4½¢</i>
<i>Annealed Wire on Spools.</i> .....60¢ <del>10¢</del> 10@70¢	
<b>Brass and Copper Wire on Spools.</b> .....50¢ <del>10¢</del> 0¢	<b>Wire Barb—See Trade Report.</b>
<b>Brass, list Feb. 26, '96.</b> .....20¢	<b>Wire, Rope—See Rope, Wire.</b>
	<b>Wrenches—</b>
	<i>Agricultural</i> .....70¢ <del>10¢</del> 10@70¢ <del>10¢</del> 5%
	<i>Baxter's S.</i> .....60¢ <del>10¢</del> 10%
	<i>Coe's (Genuine)</i> .....40¢ <del>10¢</del> 10¢
	<i>Coe's' Mechanics</i> .....40¢ <del>10¢</del> 10¢ <del>5¢</del> 5½¢
	<i>Aiken</i> .....60¢ <del>10¢</del> 10%
	<i>Aiken's' Pocket (Bright)</i> .....50¢ <del>10¢</del> 10%
	<i>Alligator</i> .....60¢ <del>10¢</del> 10¢
	<b>Yokes, Neck—</b>
	<i>Covert Saddlery Works, Trimble L80@5½¢</i>
	<i>Covert Saddlery Works, Neck Yoke</i>
	<i>Centers</i> .....70¢
	<b>Yokes, Ox, and Ox Bows—</b>
	<i>Fort Madison's Farmers &amp; Freighters'.</i>
	<i>list not</i>
	<b>Zinc—</b>
	<i>Sheet</i> .....lb. 3 $\frac{1}{4}$ c@7¢

**PAINTS, OILS AND COLORS.—Wholesale Prices.**

<b>White Lead, Zinc, &amp;c.</b>	
Lead, Foreign white, in Oil.....	73¢ @ 9%
Lead, American White, in Oil:	
Lots of 500 lb or over.....	@@ 6
Lots less than 500 lb.....	@@ 6 1/4
Lead, White, in oil, 25 lb tin pails, add to keg price.....	@@ 6
Lead, White, in oil, 12½ lb tin pails, add to keg price.....	@@ 6 1/4
Lead, White, in oil, 1 to 5 lb as- sorted tins, add to keg price.....	@@ 6 1/4
Lead White, Dry in bbls.....	51¢ @ 53¢
Lead, American, Terms: On lots of 500 lbs. and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.	
Zinc, American, dry.....	7¢ @ 41¢ @ 43¢
Zinc, Paris, Red Seal, dry.....	@@ 43¢
Zinc, Paris, Green Seal, dry.....	@@ 47¢
Zinc, Antwerp Red Seal, dry.....	@@ 47¢
Zinc, Antwerp, Green seal, dry.....	@@ 49¢
Zinc, V. M. French, in Poppy Oil, Green Seal:	
Lots of 1 ton and over.....	119¢ @ 124¢
Lots of less than 1 ton.....	12¢ @ 12½¢
In, V. M French, in Poppy Oil, Gel Seal:	
Lots of 1 ton and over.....	104¢ @ 111¢
Lots of less than 1 ton.....	104¢ @ 111¢
DISCOUNTS. — V. M. French Zinc.—Dis- counts to buyers of 10 bbls. lots of one or assorted grades, 15¢: 25 bbls., 25¢: 50 bbls., 45¢.	
<b>Dry Colors.</b>	
Black, Carbon.....	7 b 8 @ 20
Black, Drop, Amer.....	2½¢ @ 4
Black, Drop, Eng.....	7 @ 11
Black, Ivory.....	15 @ 21
Lamp, Com.....	3 @ 5
Blue, Celestial.....	7 b 5½¢ @ 20
Blue, Chinese.....	.35 @ 40
Blue, Prussian.....	.90 @ 38
Blue, Ultramarine.....	3 @ 35
Brown, Spanish.....	16 @ 1
Brown, Vandyke, Amer.....	13¢ @ 21¢
Brown, Vandyke, Foreign.....	21¢ @ 31¢
Carmine, No. 40.....	7 b 23¢ @ 27.5¢
Green, Chrome, ordinary.....	5 @ 6
Green, Chrome, pure.....	18 @ 29
Lead, Red, bbls, 2½ bbls. and kegs:	
Lots 500 lb or over.....	@@ 6
Lots less than 500 lb.....	@@ 6 1/4
Litharge, bbls, 2½ bbls. and kegs:	
Lots 500 lb or over.....	@@ 6
Lots less than 500 lb.....	@@ 6 1/4
Ocher, French Washed.....	14¢ @ 2½¢
Ocher, Dutch Washed.....	43¢ @ 2½¢
Ocher, American, 1 ton \$10.00 @ \$13.00	
Orange Mineral, English.....	9¢ @ 21¢
Orange Mineral, French.....	11¢ @ 11½¢
Orange Mineral, German.....	9¢ @ 21¢
Orange Mineral, American.....	84¢ @ 8½¢
Red, Indian, English.....	4½¢ @ 8½¢
Red, Indian, American.....	3 @ 3½¢
Red, Turkey, English.....	3 @ 3½¢
Red, Tuscan, English.....	7 @ 10
Red, Venetian, Amer., \$100 lb.....	80¢ @ 1.10
Red Venetian, English, 1 ton \$80.00 @ \$12.00	
Sienna, Italian, Burnt and Powdered.....	3½¢ @ 9½¢
Sienna, Ital, Raw, Powd.....	3½¢ @ 7½¢
Sienna, American, Raw.....	1½¢ @ 2
Sienna, American, Burnt and Powdered.....	1½¢ @ 2
Talc, French.....	7 b 100 lb \$1.25 @ \$0.00
Talc, American.....	.90 @ 1.10
Terra Alba, French, 100 lb.....	.95 @ 1.00
Terra Alba, English.....	.95 @ 1.00
Terra Alba, American, No. 1.....	.65 @ 70
Terra Alba, American No. 2.....	.45 @ 50
Umber, Turkey, Bnt. & Powd, 7 b.....	26¢ @ 34¢
Umber, Turkey, Raw & Powd, 7 b.....	26¢ @ 34¢
Umber, Amer. Amer.....	1½¢ @ 2
Umber, Raw Amer.....	1½¢ @ 2
Yellow, Chrome.....	10 @ 25
Vermilion, American Lead.....	10 @ 25
Vermilion, Jutulsaliver, bulk.....	7½¢
Vermilion, Jutulsaliver, bags.....	.73¢
Vermilion, English, Import.....	.89 @ 95
Vermilion, Chinese.....	.89 @ 93
<b>Colors in Oil.</b>	
Black, Lampblack.....	10 @ 14
Blue, Chinese.....	.36 @ 40
Blue, Prussian.....	.32 @ 38
Blue, Ultramarine.....	12 @ 16
Brown, Vandyke, Amer.....	13¢ @ 21¢
Brown, Vandyke, Foreign.....	21¢ @ 31¢
Carmine, No. 40.....	7 b 23¢ @ 27.5¢
Green, Chrome, ordinary.....	5 @ 6
Brown, Vandyke, Amer.....	9½¢ @ 13
Green, Chrome.....	8 @ 12
Green, Paris.....	12 @ 21
Sienna, Raw.....	10 @ 13
Sienna, Burnt.....	10 @ 13
Umber, Raw.....	9½¢ @ 12
Umber, Burnt.....	9½¢ @ 12
<b>Miscellaneous.</b>	
Barytes, Foreign, 1 ton.....	\$19.00 @ \$21.00
Barytes, Amer. floated.....	19.00 @ \$20.00
Barytes, Crude.....	9½¢ @ 10
Chalk, in bulk.....	1 ton \$2.60 @ 2.75
Chalk, in bbls.....	100 lb .35
China Clay, English, 1 ton	12.00 @ 17.50
Cobalt, Oxide, 1 ton	2.26¢ @ 2.50
Whiting, Common, 100 lb.....	.42¢ @ .52
Whiting, Gilders.....	.54¢ @ .64
Whiting, extra Gilders.....	.58¢ @ .68
<b>Putty.</b>	
In bulk.....	\$1.90
In bladders.....	2.40
In cans, 12 lb to 25 lb.....	2.50
In cans, 1 b to 5 b.....	3.60
<b>Spirits Turpentine.</b>	
In Southern bbls.....	@@ 11¢ @ 11½¢
In machine bbls.....	@@ 11½¢
<b>Glue.</b>	
Low Grade.....	7 b 12 @ 15¢
Cabinet.....	13¢ @ 16½¢
Medium White.....	14¢ @ 16½¢
Extra White.....	18 @ 23
French.....	12 @ 40
Irish.....	13¢ @ 16
<b>Mineral Oils.</b>	
Black, 20 gravity, 25@30 cold test.....	7 gal. @ 65
Black, 29 gravity, 15 cold test.....	10½ gal. @ 11½
Black, summer.....	9½ gal. @ 9½
Cylinder, light filtered.....	14½ gal. @ 17½
Cylinder, dark filtered.....	13½ gal. @ 16½
Paraffine, 90-97 gravity.....	14½ gal. @ 15½
Paraffine, 90½ gravity.....	13½ gal. @ 14½
Paraffine, 88½ gravity.....	14½ gal. @ 13½
Paraffine, red, No. 1.....	14½ gal. @ 15½
In small lots for advance.....	
Linseed, City, boiled.....	63 @ 71
Linseed, State and West'n, raw.....	65 @ 65
Linseed, raw Calcutta seed.....	67 @ 65
Lard, Prime.....	55 @ 55
Lard, Extra No. 1.....	45 @ 50
Lard, No. 1.....	41 @ 43
Cotton-seed, Crude.....	...
Cotton-seed, Summer Yellow prime, off-grade.....	31 @ 34½
Sperm, Crude.....	...
Sperm, Natural Spring.....	...
Sperm, Bleached Spring.....	...
Sperm, Natural Winter.....	57 @ 55
Sperm, Bleached Winter.....	52 @ 50
Whale, Crude.....	35 @ 33
Whale, Natural Winter.....	35 @ 33
Whale, Bleached Winter.....	35 @ 33
Menhaden, Crude, Sound.....	25 @ 25
Menhaden, Light Striped.....	39 @ 33
Menhaden, Bleached Winter.....	35 @ 33
Menhaden, Extra Bleached.....	37 @ 37
Tallow, prime.....	53 @ 54
Cocoanut, Ceylon.....	57½ gal. @ 61½
Cocoanut, Cochin.....	57½ gal. @ 61½
Cod, Domestic.....	30 @ 33
Cod, Newfoundland.....	35 @ 38
Red Elaine.....	31 @ 33
Red Saponifei.....	7 ½ gal. @ 5
Olive, Italian, bbls.....	55 @ 60
Neatsfoot, prime.....	43 @ 50
Palm, prime, Lagos.....	7 b 5½ gal. @ 6

# THE IRON AGE.

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

**RATES OF SUBSCRIPTION: INCLUDING POSTAGE.**

## UNITED STATES AND BRITISH AMERICA.

**Regular Edition**, Issued every THURSDAY morning, \$5.00 a year.  
**Two Dollar Edition**, large number FIRST and THIRD THURSDAYS of every month, Bulletin number each intervening Thursday, 2.00 "  
Price, \$1.00 a copy. For a Three month's subscription, Bulletin number each intervening Thursday, 2.00 "

## **RATES OF ADVERTISING: ONE INCH.**

**RATES OF ADVERTISING.** *See Index.*

ONE INSERTION, - - - - -	\$3.00	SIX MONTHS, - - - - -	\$45.00
ONE MONTH, (5 times) - - - - -	11.25	ONE YEAR, - - - - -	75.00
THREE MONTHS, - - - - -	26.25	Rates for larger spaces quoted on application.	

DAVID WILLIAMS CO., Pub'rs.  
THOMAS HOBSON, Manager.  
ROBERT A. WALKER, Manager.  
H. H. ROBERTS, Business Manager.  
GEO. W. COPE, Resident Asso. Ed.  
HENRY SMITH, Manager.  
C. F. WIELAND, Manager.  
WALTER-C. ENGLISH, Manager.  
EZRAS S. ADAMS, Manager.

**BRITISH AGENCY:** Office of *The Ironmonger*, 42 Cannon Street, London.

**AUSTRALIAN OFFICES:** Melbourne, Hardware Chambers, 231 Elizabeth Street; Sydney, Palings Buildings

Remittances should be made by draft, payable to the order of DAVID WILLIAMS COMPANY, on any banking house in the United States or Europe, or by P. O. Money order on New York. When these cannot be obtained, postage stamps of any country will be received.  
Newsmen or Booksellers in any part of the world may obtain *The Iron Age* through the American News Company, New York, U. S. A.; The International News Company, New York, U. S. A., and London, England; or The San Francisco News Company, San Francisco, Cal., U. S. A.

Entered at the Post Office, New York, as Second-class Matter.

# CURRENT METAL PRICES.

AUGUST 22, 1900.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

## IRON AND STEEL— Bar Iron from Store—

Common Iron: Duty, Round, 0.6¢ per lb.; Square, 0.8¢ per lb.
1 to 1½ in. round and square ..... 1 lb. 1.70@1.80¢
1½ to 2 in. x ½ to 1 in. ....
Refined Iron:
1 to 1½ in. round and square ..... 1 lb. 1.80@1.90¢
1½ to 4 in. x ½ to 1 in. ....
1½ to 4 in. x 1/4 to 5-16. .... 2.00@2.10¢
Rods—½ and 1-16 round and square. 2.20@2.30¢
Angles:
3 in. x 1 in. and larger ..... 2.10¢
3 to 3½ in. x 3-16 in. .... 2.10¢
1½ to 2½ in. x 3-16 in. and thicker. .... 2.10¢
1 to 1½ in. x 3-16 in. .... 2.20¢
1 to 1½ in. x ½ in. .... 2.30¢
½ x ½ in. .... 2.60¢
¾ x ¾ in. .... 2.65¢
½ x 1 in. .... 3.30¢
¾ x 1 in. .... 3.80¢
Tees:
1 in. .... 2.50¢
1½ in. and larger. .... 2.40¢
Beams:
Channels, 8 in. and larger ..... 2.50¢
Bands—½ to 6 x 3-16 to No. 8. .... 2.10¢
"Burden's Best" Iron, base price. .... 3.60¢
Purdon's "H. B. & S. Iron, base price. .... 3.40¢
"Ulster" ..... 3.60¢
Norway Bars. .... 4.14@4.44¢
Norway Shapes. .... 4.14@5.0¢

## Merchant Steel from Store—

Beaumar Machinery. ....	1.70 to 1.80¢
Toe Calk, Tire and Sleigh Shoe. .... 3.00@2.50¢	
Best Cast Steel, base price in small lots. .... 8¢	
Best Cast Steel Machinery, base price in small lots. .... 8¢	
Soft Steel Sheets—	
14 in. .... 1.85¢ No. 14. .... 2.60¢	
16 in. .... 1.90¢ No. 16. .... 2.70¢	
No. 8. .... 2.20¢ No. 18. .... 3.00¢	
No. 10. .... 2.30¢ No. 20. .... 3.30¢	
No. 12. .... 2.40¢ No. 22. .... 3.40¢	

## Sheet Iron from Store.

### Black.

Common American. ....	R. G. Cleaned American. ....
No. 14 to 16. .... 3.00¢	3.10¢
No. 18 to 21. .... 3.10¢	3.20¢
No. 22 to 24. .... 3.20¢	3.30¢
No. 25 and 26. .... 3.30¢	3.40¢
No. 27. .... 3.40¢	3.50¢
No. 28. .... 3.50¢	3.60¢

## Russia, Planished, &c.

Genuine Russia, according to assort- ment. ....	10¢ per lb.
Patent Planished. ....	10¢ per lb.
Galvanized. ....	10¢ per lb.

No. 10 to 16. ....	12¢ per lb.
No. 17 to 21. ....	13¢ per lb.
No. 22 to 24. ....	14¢ per lb.
No. 25 to 28. ....	15¢ per lb.
No. 27. ....	16¢ per lb.
No. 28. ....	17¢ per lb.
No. 29. ....	18¢ per lb.
No. 30. ....	19¢ per lb.
36 in. 16¢ per lb. higher.	

## Foreign Steel from Store—

Best Cast. ....	15¢ per lb.
Extra Cast. ....	18¢ per lb.
Swaged, Cast. ....	16¢ per lb.
Best Double Shear. ....	15¢ per lb.
Bilster, 1st quality. ....	13¢ per lb.
German Steel, Best. ....	10¢ per lb.
2d quality. ....	9¢ per lb.
Sheet Cast Steel, 1st quality. ....	15¢ per lb.
2d quality. ....	14¢ per lb.
3d quality. ....	13¢ per lb.
R. Mushet's "Special" Annealed. ....	75¢ per lb.
"Titanic" Annealed. ....	19¢ per lb.
Hobson's Choice XX Extra Best. ....	25¢ per lb.
Jessop Self Hardening. ....	45¢ per lb.
Seaman's "Nelson" Steel. ....	40¢ per lb.
Hobson's "Soho" Special Hardening. ....	43¢ per lb.

## METALS—

### Tin—

Duty.—Pigs, Bars and Block. Free.	Per lb.
Banca, Pigs. ....	33¢@33¢
Straits, Pigs. ....	32¢@32¢
Straits in Bars. ....	33¢@33¢

### Tin Plates—

#### American Charcoal Plates.

Calland Grade:	
IC, 14 x 20. ....	\$7.50
IX, 14 x 20. ....	9.00
Melyn Grade:	
IC, 14 x 20. ....	7.00
IX, 14 x 20. ....	8.50
Allaway Grade:	
IC, 14 x 20. ....	6.15
IX, 14 x 20. ....	7.25

American Coke Plates—Bessemer—	
IC, 14 x 20. ....	\$5.30
IX, 14 x 20. ....	6.35
IXX, 14 x 20. ....	7.50

### American Terne Plates—

IC, 20 x 28. ....	\$10.60
IX, 20 x 28. ....	12.50

### Tin Boiler Plates, American—

XXX, 14 x 28. ....	112 sheets. .... \$13.00
XXX, 14 x 28. ....	112 sheets. .... 14.00
XXX, 14 x 31. ....	112 sheets. .... 15.00

### Copper—

Duty: Pig, Bar and Ingot and Old Copper free Manufactured, 2¢ per lb.	
Ingot—	

Lake. ....	17¢@17¢
Ansonia grade Casting. ....	17¢@17¢

## Sheet and Bolt—

January 19, 1900.

Prices, in cents per pound.

Sheet 20¢ to 60¢.

Net.

Common High Brass, in.	in.	in.	in.	in.	in.	in.	in.
Wider than	26	28	30	32	34	36	38
and including	28	30	32	34	36	38	40
To No. 20, inclusive. ....	.39	.42	.46	.50	.55	.60	.65
No. 21, 22, 23 and 24. ....	.40	.43	.47	.51	.56	.61	.68
No. 25 and 26. ....	.41	.44	.48	.52	.57	.63	.71
No. 27 and 28. ....	.42	.45	.49	.53	.58	.65	.75

\* Special prices not less than 80 cents.

Add 1¢ per lb. additional for each number thinner than No. 28 to 38 inclusive. Discount from List. ....

20%

Wire in Coils. .... List February 26, 1896.

Brown & Sharpe's gauge the standard.	Com. high brass.	Low brass.	Gild'g bronze and copper
All Nos. to No. 10, inclusive. ....	\$0.23	\$0.27	\$0.28
Above No. 10 to No. 19. ....	.23¢	.28	.32
No. 17 and No. 18. ....	.24	.29	.34
No. 19 and No. 20. ....	.25	.30	.35
No. 21. ....	.26	.31	.36
No. 22. ....	.27	.31	.36
No. 23. ....	.28	.32	.37
No. 24. ....	.29	.33	.38
No. 25. ....	.30	.34	.39
No. 26. ....	.31	.35	.40
No. 27. ....	.32	.36	.41
No. 28. ....	.33	.37	.42
No. 29. ....	.34	.38	.43
No. 30. ....	.35	.39	.44
No. 31. ....	.36	.40	.45
No. 32. ....	.37	.41	.46
No. 33. ....	.38	.42	.47
No. 34. ....	.39	.43	.48
No. 35. ....	.40	.44	.50
No. 36. ....	.41	.45	.51
No. 37. ....	.42	.46	.52
No. 38. ....	.43	.47	.53
No. 39. ....	.44	.48	.54
No. 40. ....	.45	.49	.55

Discount, Brass Wire, 20%; Copper Wire, Net.  
List November 16, 1900.

Spring Wire, 2¢ per lb. advance.

Tobin Bronze—

Straight, but not turned, Rods, ½ to 3 in. diameter, 2¢ per lb. net.

Finished Piston Rods, ½ to 2½ in. diameter, 2¢ per lb. net.

21¢

Other sizes and extreme lengths, special prices.

## Spliter—

Duty: In Blocks or Pigs. 1¢ per lb.

Western Spliter. ....

Zinc. ....

Duty: Sheet, 2¢ per lb.

600 lb. casks. .... 7¢ per lb.

Lead. ....

Duty: Pigs and Bars and Old, 2½¢ per lb. Pipe and Sheets, 2½¢ per lb.

American Pig. ....

Pipe. ....

In Lined Pipe. ....

Block Tin Pipe. ....

Sheet Lead. ....

Old Lead in Exchange, 3¢ per lb. b.

Solder. ....

1¢ &amp; 1½¢ guaranteed. .... 20¢@21¢

No. 1. .... 17¢@18¢

Prices of Solder indicated by private brand vary according to composition.

## Antimony—

Duty, 2¢ per lb.

Cookson. ....

Halett's. ....

U. S. ....

2¢ 10¢@10¢

Pipe. ....

In Lined Pipe. ....

Block Tin Pipe. ....

Sheet Lead. ....

Old Lead in Exchange, 3¢ per lb. b.

Aluminum Sheet, B. &amp; S. gauge. 50 lb. or more.

Wider than. ....

14 in. 13-in. 24-in.

And including. ....

14 in. 13-in. 24-in.

No. 18. ....

20¢@20¢

No. 20. ....

44

40

49

51

No. 21 to 23. ....

46

50

53

No. 24. ....

47

51

No. 25. ....

48

54

No. 26. ....

49

57

No. 27. ....

50

61

No. 28. ....

51

67

# CARY'S BOX STRAPPING.

MADE IN VARIOUS WIDTHS.

CARY MFG. CO., 19 & 21 Roosevelt St., New York.

## WHY ARE WE LEADERS?

BECAUSE the largest consumers acknowledge the superior quality of our

**Scrap Copper, Scrap Brass, Scrap Lead, Scrap Zinc,**  
and all kinds of old Metals. Write for prices to

**THEODORE HOFELLER & CO.**  
98, 100, 102 TERRACE, BUFFALO, N.Y.

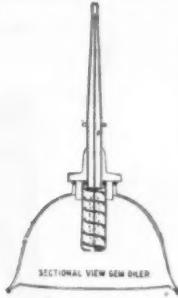
All Metals Carefully GRADED and Made FREE of Iron.

# OUR WAY IRON

Equal to Best Swedish and Norway.



The Gem Oiler  
once used—  
well,  
the man won't  
take any other  
kind thereafter.  
Why is this so?



**GEM MANUFACTURING CO.,**

200, 202 Wood St.,  
Pittsburg, Pa.

## DOMESTIC ELECTRICAL WORK.

Concise and Practical Explanations for Plumbers, Tinniers and Hardware Dealers on How to Wire Buildings for Bells, Alarms, Annunciators, and for Gas Lighting from Batteries. Illustrated with Twenty-two Diagrams.

BY WILLIAM A. WITTBECKER.

Price, in Paper, 25 Cents. Price, in Cloth, 50 Cents.

The growing demand for simple electrical apparatus in dwelling houses, offices and workshops, and the need of plain instructions whereby any person without a previous knowledge of electricity may be enabled to undertake their successful installation, has prompted the publication of this little book. It is not intended for the amateur who seeks for nothing but experimental work, neither is it expected to enlighten the expert electrician; but to the person who is seeking for information that will assist him in increasing his daily earnings this little volume is addressed.

**DAVID WILLIAMS COMPANY,**

Publishers and Booksellers,

232-238 William St., . . . . . New York



**THE PIKE MFG. CO., PIKE STATION, N. H.**

Send for 64-page catalog and prices.

# Sharpening Stones

give

satisfaction and pay the dealer well.

New York Store,  
151 Chambers St.

## COVERT'S



FARMER, N.Y., U.S.A.

**VICTOR**  
WAGON JACK.

## THE IVES PATENT DOOR BOLTS,

Sash Locks  
and WINDOW  
HARDWARE  
SPECIALTIES.  
LEADERS WITH  
THE TRADE.

50-PAGE CATALOGUE ON APPLICATION.

H. B. IVES & CO., New Haven, Conn.

ESTABLISHED 1825.

**BROWN & CO., INC.,**  
PITTSBURGH, PA.

## PRIEST'S CLIPPERS

Largest Variety,  
Ball, Bearings  
Toliet, Hand, Electric Power  
ARE THE BEST.  
Highest Quality Grooming and  
Sheep-Shearing Mach'nes.  
WE MAKE THEM.  
SEND FOR CATALOGUE TO  
American Shears Mfg. Co., Nashua, N.H., U.S.A.

## GUARDIAN REGISTERS

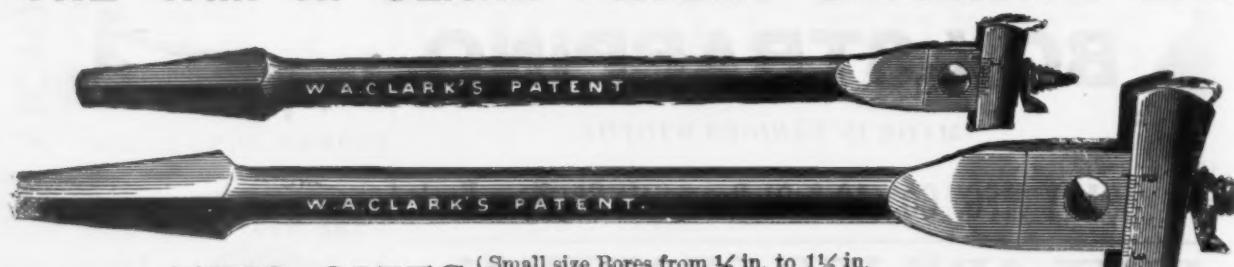
\$15 to \$50



New Booklet  
Sent Free

Showing the Register suitable  
for your business.

## THE WM. A. CLARK PATENT EXPANSIVE BIT.



**TWO SIZES** { Small size Bores from  $\frac{1}{4}$  in. to  $1\frac{1}{2}$  in.  
Large " " "  $\frac{5}{8}$  in. " 3 in.

SPECIAL CUTTERS: No. 5—For Large Bit, Bores from 3 in. to 4 in. No. 6—For Large Bit, Bores from 4 in. to 5 in.

Stock and workmanship superior to all others. Every part interchangeable.

Quality guaranteed. For sale by all Hardware Dealers.

Manufactured by

**R. H. BROWN & CO.,**

New Haven, Conn.

## THE STAR POWER HACK SAW.

You can no longer be won over by quality.  
We make only the best!



**SAND PAPERS** { Flint Paper  
Carnet Paper  
Emery Paper  
Emery Cloth  
IN Reams and Rolls

HAIR FELTING for covering Boilers, Steam and Water Pipe, and lining Refrigerators.

**BAEDER, ADAMSON & CO.**

730 MARKET STREET, PHILADELPHIA.  
67 BEEKMAN STREET, NEW YORK.  
143 MILK STREET, BOSTON.  
162 LAKE STREET, CHICAGO.



When buying a Power Hack Saw be careful to see that you procure one suitable for all kinds of work which such machines are intended for. The Star Machine is one of this sort and will under all conditions give satisfaction. It cuts up to  $4\frac{1}{2}$  ins. and adapts itself to all grades of metals.

They are sold by prominent Machinery and Supply Dealers throughout this and foreign countries.

PRICE . . . . . each, \$25.00.

**MILLERS FALLS CO., 28 Warren St., NEW YORK CITY.**

OTHER TOOLS ARE VERY GOOD TOOLS, BUT—

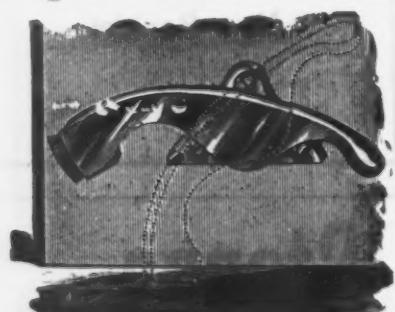
**"YANKEE" TOOLS ARE BETTER.**



Sold by Leading Jobbers. Send for "YANKEE" Tool Book No. 2, Just Issued.

**NORTH BROS. MFG. CO., - PHILADELPHIA, PA.**  
New York Agents, JOHN H. GRAHAM & CO., 113 Chambers St.

## Empire Door Holder.



Operated by a light pressure of the toe. No bending over. The Rubber Tip and Spring Action make it particularly desirable for use on carpet polished wood or tiled floor.

MANUFACTURED BY

**CALDWELL MFG. CO.,**  
ROCHESTER, N. Y., U. S. A.



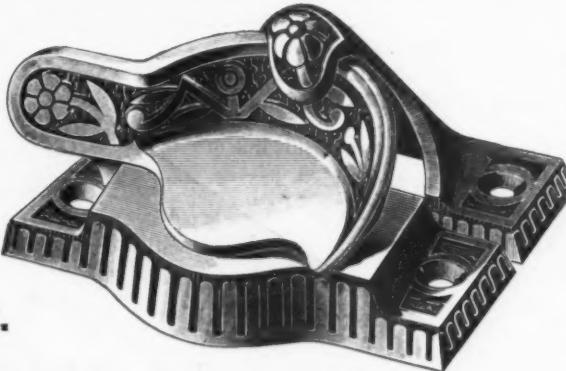
**SAMSON SCREW DRIVERS**

**BITS ARE O. K.**

Send for catalogue of tools to  
**SAWYER TOOL CO., - Fitchburg, Mass.**

# "READING" PATENT SASH FASTENERS.

Neat,  
Simple,  
Secure,  
No Rivets,  
No Rattling.



Plain or  
Ornamented.  
Bronzed or  
Bronze Metal.  
All Finishes.

**READING HARDWARE CO., Reading, Pa.**

New York,  
96 and 98 Reade Street.

Philadelphia,  
617 Market Street.

Chicago,  
105 Lake Street.



Warranted.  
Conn. Valley Mfg. Co.,  
CENTERBROOK, CONN., U. S. A.



## Pail Ears — AND — Saucepan Handles.

Neatest Designs, Greatest Strength and Finest Finish of any made.

Large stock of all sizes constantly on hand and all orders filled promptly. By the gross, package or in bulk, as desired.

**BERGER BROS. CO.,**  
PHILADELPHIA.  
SEND FOR CATALOGUE.



## Steel Giant Grubber.

One of the most useful implements yet invented.  
With this machine you exterminate the Sapling, Grub or Bush, as it lifts it out of the ground, root and body.

### A GREAT LABOR SAVER.

Does the work of five men.  
Send for particulars and testimonials.

**New Century Manufacturing Co.,**  
48 East 8th Street, New York.

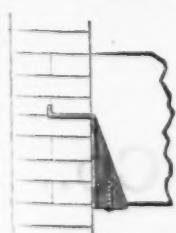


## "PANCOAST" VENTILATORS.

PERFECT GOODS and LOWEST PRICES  
are our strong points.

NATIONAL PANCOAST VENTILATOR CO.,  
Main Office, 723 Drexel Bldg., Philadelphia.  
PRICES AND CATALOG SENT ON APPLICATION.

## ARE YOU BUILDING?



Don't weaken the Joists or Headers or Walls by cutting into them. Use hangers. We make all sizes.

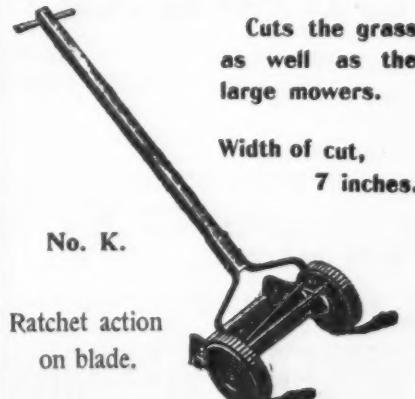
Send for Hanger List.



**THE W. J. CLARK CO., Salem, Ohio.**

H

## JUNIOR (TOY) Lawn Mower A NOVELTY.



No. K.

Ratchet action  
on blade.

Packed two dozen in a case.

**CRESCEENT BRASS & IRON CO.,**  
DETROIT.

TRY

**Mugford's Half Tones,**  
Wood Cuts and Electrotypes.

"You See Them Everywhere."

**A. MUGFORD,**  
ENGRAVER and ELECTROTYPE.  
HARTFORD, CONN.

New York Office, 190 Liberty Street.

# No. 52

HAND, PANEL, and RIP SAWS.  
SILVER STEEL, WARRANTED.  
DAMASKENED.  
SKEW BACK, CARVED  
and POLISHED HANDLE

We are thoroughly equipped for the manufacture of this line of goods. All the improved machinery and methods known to the trade in this country and Europe are known to us. To these we have added many improvements of our own, which places us in position to meet the most exacting demands of users of this class of saws, and we therefore can recommend them with every confidence in their merit and worth.



# Simonds Mfg. Co.,

NEW YORK, N. Y. PORTLAND, ORE.  
FITCHBURG, MASS. CHICAGO, ILL. SEATTLE, WASH.

Simonds Mfg. Co., Ltd  
New Orleans, La.

Simonds Saw Co.,  
San Francisco, Cal.

## "NEVER TWIST" and "NEW CENTURY" SCREW DRIVERS

Write for Prices.

BRAUNSDORF-MUELLER CO., Elizabeth, N. J.

## MODERN METHODS

of Store Arrangement, Accommodation and Effective Display of Hardware Stock are illustrated and described only in

The American Hardware Store.

450 Pages. 500 Illustrations.  
THREE DOLLARS.

DAVID WILLIAMS CO., Publishers.  
232-238 William St., New York.

## BUTCHER SAWS.

SEND FOR PRICES.

The National Saw Co.,

NEWARK, N. J.

**HENRY DISSTON & SONS, Inc.,**  
PHILADELPHIA, PENNA.

MANUFACTURERS OF

# Saws, Files AND Tools

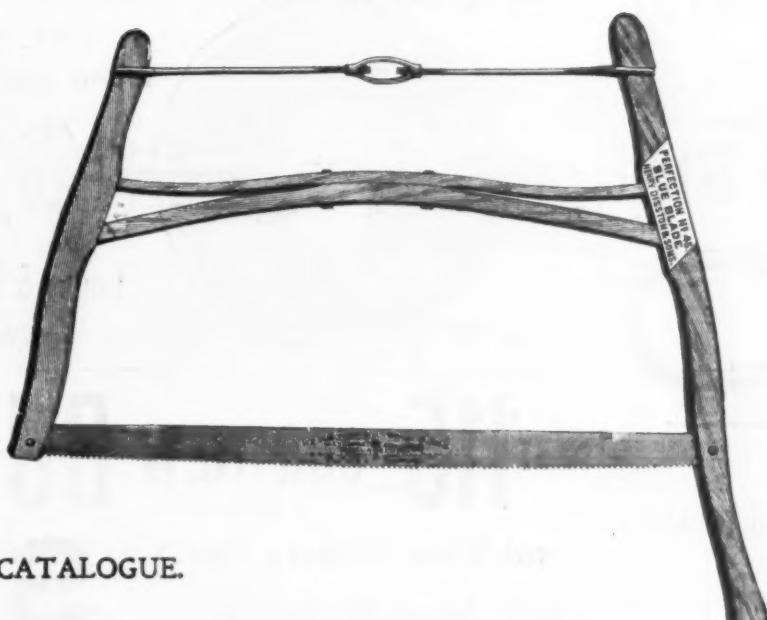
—OF—

**SUPERIOR QUALITY and UNSURPASSED WORKMANSHIP.**

## WOOD SAWS.

ALL PATTERNS.

TROWELS,  
TRY SQUARES,  
BEVELS,  
PLUMB and LEVELS.  
GAUGES,  
SCREW DRIVERS,  
CROUT CUTTERS,  
DIGGERS,  
CORN KNIVES,  
SAW CLAMPS,  
SCREWS,  
ETC.



WRITE FOR OUR  
ILLUSTRATED CATALOGUE.

HANDLES,  
BACK SAWS,  
PRUNING SAWS,  
HACK SAWS,  
COMPASS SAWS,  
BUTCHER SAWS,  
BAND SAWS,  
CIRCULAR SAWS,  
MANDRELS,  
GUMMERS,  
TOOLS,  
ETC.

OUR  
TREATISE  
ON  
SAWS  
SENT FREE  
ON APPLICATION.

## D<sup>100</sup> HAND SAW.



Our Newest Production of High Grade Hand Saws. A Perfectly Proportioned, Beautifully Finished Tool.

**FILES:** MANUFACTURED FROM CRUCIBLE STEEL, CAREFULLY FORGED AND HARDENED. CORRECTLY SHAPED TEETH. THE MOST DURABLE FILES ON THE MARKET.



“VIM” Champion Tooth Saw, High Grade Steel, Taper Ground.



WE MANUFACTURE THE LARGEST LINE OF SAWS IN THE WORLD.



Write  
for  
Circulars.

To Cut Grass from 6 to 10 inches  
high. 25-inch Knives.

This Mower can be used with a pony and a boy to guide the mower, or one man to pull and a boy to guide. Double train of gears, large reel with patent cylinder knives, rear cut train of gears on both sides, Enos patent bed knife, patent draft irons, shifting clutch, weight 110 pounds.

**Supplee Hardware Co.,**  
PHILADELPHIA.



**NICOL & CO.,**  
Manufacturers of  
Special and Light  
**HARDWARE,**  
57 W. Washington St.,  
Chicago, Ills., U. S. A.

**THE BEST  
KEY-HOLE SAW HANDLE**

IS THE



**NEVER SLIP.**

**W. C. LADD, Maker, Bristol, Conn.**  
WRITE FOR PRICES.

**PLAIN AND RATCHET BIT BRACES.**

The largest line made in U. S.



**MASON & PARKER,**  
Winchendon, Mass.  
Also Makers of other  
**Hardware Specialties.**

JOHN H. GRAHAM & CO., Agents, 118 Chambers St., N. Y.



Sample, by mail, 25 cents.

**GEM NAIL CLIPPER**

Cuts, Cleans and Files.

It is a neat, well made, nickel plated article. Put up attractively and sold cheaply. Send for circulars and prices.

The H. C. Cook Co., Ahsonton, Conn., U. S. A.

**Little Trojan Tack Puller.**

Built to Pull all  
kinds of Tacks.

**HAGEN & REID,**  
TROY, N. Y.

# The PONY or Two-Man Mower.



## STOVE PIPE DAMPERS.

THE BEST MADE.

Wood Handle, Iron Handle,  
ALL SIZES.  
3 In. to 10 In.  
It will pay all who sell  
Dampers to write us.

**Logan & Strobridge Iron Co.,**  
NEW BRIGHTON, PA.

**No. 115 OUR NEW BUTCHER  
SAW**  
Send Your Orders Early.  
THIS IS A WINNER...  
The Latest, Best, and Price Right.

**C. E. JENNINGS & CO.,**  
101 Reade Street, New York.

## THE NATIONAL CELEBRATED SHEARS.

A Complete Line and Fully Warranted.

Trimmers, Scissors, Tinner's Snips, Dental Shears and Snips.

SEND FOR CATALOGUE.



WE SELL TO JOBBERS ONLY.

**NATIONAL CUTLERY CO.,** 3d St. and Lehigh Avenue,  
PHILADELPHIA, PA., U. S. A.  
NEW YORK OFFICE, 101 READE ST.



## CELEBRATED LANG SHEARS

Patented Bolt and Tension Spring.  
Manufacturers of full line of Bent and Straight  
High Grade, Steel Laid Shears.  
Send for Catalogue.

**LANG CUTLERY WORKS,**  
Cedar Rapids, Ia.

47 YEARS.

ESTABLISHED 1853.

47 YEARS.

Celebrated Buck Brothers' Tools Stamped With the Buck's Head.

Chisels, Gouges, Plane Irons, Carving Tools, Nail Sets,  
Screw Driver Bits, Razors and**ICE PICKS.****BUCK BROTHERS, MILLBURY, MASS.****HIGHEST AWARD PARIS EXPOSITION, 1889.**

ESTABLISHED 1837.

INCORPORATED 1892.

**THE L. & I. J. WHITE CO.,**MANUFACTURERS OF **EDGE TOOLS.**

BUFFALO, N. Y., U. S. A.

Coopers', Carpenters' and Ship Tools, Plane Irons,  
Cleavers, &c. Full Line Chisels.

New York Office, 45 Centre St.

78 YEARS.

ESTABLISHED 1825.

**CELEBRATED HEINISCH SHEARS**  
ACKNOWLEDGED THE BEST.

Tailors' Shears, Trimmers, Scissors, Tinner's Snips, etc.

**R. HEINISCH'S SONS CO.,**

New York Office, 90 Chambers Street.

NEWARK, N. J.

NOT CONNECTED WITH ANY SHEAR COMBINATION.

**SOCKET FIRMER CHISELS**  
BEVELED EDGES.**CHARLES BUCK TOOLS**

have a world wide reputation.

SEND FOR CATALOGUE OF FULL LINE.

Screw Driver Bits, Reamers, Cupped Nail Sets, Gouges, etc., etc.

**MILLBURY EDGE TOOL WORKS,**

CHARLES BUCK, Proprietor.

MILLBURY, MASS., U. S. A.

**Cattaraugus Cone Bearing Shears**

Here is where the bearing comes on this perfect cone.

This is the lock where the bolt fastens to the lower shear blade.

**CATTARAUGUS CUTLERY CO.,**

- Little Valley, N. Y.

**THE CELEBRATED  
RED SEAL SHEARS.**

MANUFACTURED ONLY BY

**THE ACME SHEAR CO.**

BRIDGEPORT, CONN.

The **"ORIGINAL JENNINGS"** AUGERS and AUGER BITS.  Genuine have "Russell Jennings" stamped in full on the Round of each Bit.

FOR SALE BY ALL HARDWARE JOBBERS.  
The Russell Jennings Mfg. Co., Deep River, Ct., U. S. A.

Established 1774.

**HIGH GRADE AUGER BITS.**  
(BLACK TWIST)**JOB T. PUGH, PHILADELPHIA.**

THE

**Ford Ship Augers.**

SECOND TO NONE.

Prices Right.

**THE FORD BIT CO.**

HOLYOKE, MASS.

American Tool Chest Company,

NEW YORK.

MANUFACTURERS OF

**TOOL CHESTS**Of all sizes, complete with tools, for Hardware, Top  
Notion and Variety trades.

Factory and Saleroom,

200 West Houston Street, near Varick.  
Also Machinists' Tool Chests, empty. Tool Cabinets  
and Work Benches. Illustrated Catalogues  
and prices furnished on application.**The Household Cobbler.**

Write us for prices.

We are closing out these sets below  
cost. Get our prices. They  
will astonish you.**W. Schrayer's Sons & Co.**

49 Blue Island Ave.

CHICAGO, ILL.

## THE

**SUPERIORITY OF**

Griffin's Improved

**Pressed Steel****Shelf Bracket**

IS UNQUESTIONED.

Attractive { IN DESIGN.  
IN FINISH.  
IN PRICE.

SOLD BY ALL LEADING JOBBERS.

Write for prices.

THE GRIFFIN MFG. CO. - Allegheny, Pa.

**SAFETY FUSE.**

ENSIGN, BICKFORD &amp; CO.,

Simsbury, Connecticut,  
U. S. A.

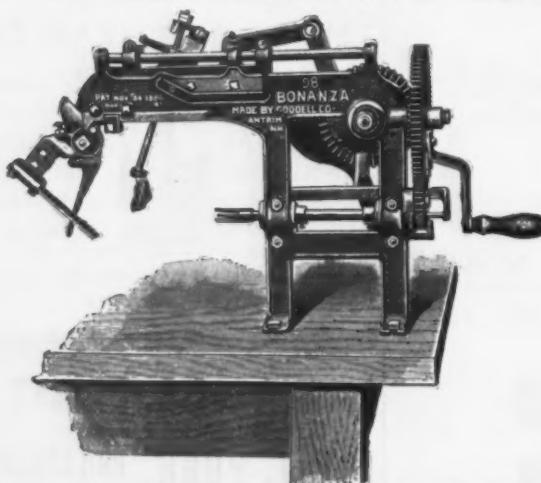
GERMAN GIMLET  
DOUBLE CUT GIMLET  
SCREW DRIVER  
BELL HANGERS'

**BITS.**

Send for Catalogue.

NORTON MFG. CO., - Chester, Conn.

# THIS IS OUR BUSY SEASON ON APPLE PARERS.



Don't wait until the last minute before placing order. It's the man who gets his order in first who gets the goods, and the man who has the goods who sells them.

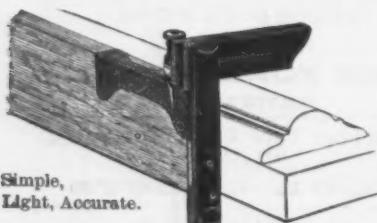
Our line comprises the most desirable parers for evaporators, bakers, hotels, restaurants and family use. Catalogue free.

This cut represents the '98 Bonanza Parer and Corer, especially designed for evaporating; not a cheap machine but a machine cheap. Retail price, \$6.50. It is faster, more durable, and does better work than any \$10.00 parer on the market.

## GOODELL COMPANY,

New York Office, 10 Warren St.

Factory and Main Office, Antrim, N. H.



Simple,  
Light,  
Accurate.

May be used on top of the wood.  
May be attached directly to bench.  
May be mounted on board fastened to bench.  
Any ordinary saw may be used.  
Easily adjusted to any angle.



SEAVEY'S PATENT MITRE BOX  
Manufactured by  
**THOMSON BROS. & CO., Lowell, Mass.**  
New York Office and Selling Agents: Smith & Hemenway  
Co., 296 Broadway, New York.



Weight, 2 pounds.  
May be folded to occupy little space.  
With it you can cut stock of any size.  
List, \$30.00 per doz.  
Send for disc.

Send for illustrated leaflet describing our new  
**DOMINION PATTERN**  
**COW TIE and STALL FIXTURE.**  
ONEIDA COMMUNITY, Ltd.,  
Niagara Falls, N. Y.

**SUMMER  
Ice Tools.**

Ice Tongs Axes, Saws, Scales.  
Send for Catalogue.  
**WM. T. WOOD & CO.,**  
Arlington, Mass., U. S. A.

## GARLAND'S RIVETS AND PUMP CHAIN

— SUCCESSORS TO —

American Steel & Wire Co., Rivet and Pump Chain  
Depts.; H. P. Nail Co., Rivets, Cleveland; Wash-  
burn & Moen, Pump Chain, Worcester.

**GARLAND CHAIN CO., Rankin Station, Pa.**



**MONCE'S NOVELTY GLASS CUTTERS. INTERCHANGEABLE LOCK STENCILS**

No. 1 Cutter, born 1871, and has been worthy of extensive imitation, that is why I keep it before you.  
We make others.

**S. G. MONCE, UNIONVILLE, CONN.**

# INTERNATIONAL SILVER CO.

THE HOLMES & EDWARDS SILVER CO.,  
(FACTORY C.)  
Sterling Inlaid, Plated and Unplated  
Flatware.  
Bridgeport, Conn.

MERIDEN BRITANNIA COMPANY,  
(FACTORY E.)  
Sterling and Plated Hollowware.  
Sterling and Plated Flatware.  
Meriden, Conn.

THE WM. ROGERS MFG. CO.,  
(FACTORY H.)  
Plated Flatware.  
Hartford, Conn.

PACIFIC COAST BRANCH:  
SAN FRANCISCO.

## SUCCESSOR

Makers of Every Description of

## STERLING SILVER AND SILVER PLATE.

Send for catalogues. Correspondence should be with the  
factory making the goods you require.

General Office, - MERIDEN, CONN.

NEW YORK:  
9-11-13 MAIDEN LANE.

CHICAGO:  
195 STATE ST.,

ROGERS & BROTHER,  
(FACTORY J.)  
Plated Flatware.  
Waterbury, Conn.

THE ROGERS & HAMILTON CO.,  
(FACTORY K.)  
Plated Flatware.  
Waterbury, Conn.

SIMPSON, HALL, MILLER & CO.,  
(FACTORY L.)  
Sterling and Plated Hollowware.  
Sterling and Plated Flatware.  
Wallingford, Conn.  
AND OTHERS.

CANADA BRANCHES:  
HAMILTON and TORONTO.

The Old  
Reliable  
Kind.

## Metal Worker's Crayon.

THE D. M. STEWARD MFG. CO.

New York Office,  
107 Chambers St.

Genuine Soapstone Pencils.

D. M. STEWARD MFG. CO.

Uniform  
Discounts

CHATTANOOGA,  
TENN.

## "Chicago" Autograph Time Recorders.

Give Absolute Secur-  
ity to  
Your Pay Rolls.

The employee registers  
by SIGNING HIS NAME.  
The Recorder PRINTS the  
TIME opposite the space  
for signature, and where  
IT CAN BE EASILY SEEN  
while signing.

A PERFECT means for  
keeping CLOSE TIME on  
PIECE or JOB work.

A system that CANNOT  
BE BEATEN.

The "CHICAGO" is the  
ONLY RELIABLE AUTO-  
GRAPH RECORDER  
EVER made.

We also make a KEY  
RECORDER.

WRITE FOR CIRCU-  
LARS. They tell all about  
both kinds.

See our exhibit in Amer-  
ican section of Furni-  
ture Building, Expos-  
ition des Invalides. Ap-  
ply to Franco-American  
Co., 162 Ave. Parmentier,  
Paris.

Chicago Time Register Co.,

11 South Water St., Chicago.

Branches—189 Broadway, New York.  
911 Girard Bldg., Philadelphia.  
348 Markham St., Toronto, Canada.  
5 Bradford Ave., Redcross St., London, E. C.

## WHEN ORDERING

BUTCHER, BREAD, STEAK, STICKING,  
SKINNING, BONING,  
TRIMMING or KITCHEN Knives

REMEMBER Emmert Hartzell's HAMMER FORGED KNIVES are  
the Cheapest and Best, because they are made from cast steel that other  
Manufacturers consider to expensive to use in such a Common Tool.  
We have learned better than that; we make every size and shape of Blade  
on the Market in three grades of finish, but use only one grade of  
steel for the Blades. All Goods Guaranteed. Send for Illustrated Price List.  
EMMERT HARTZELL, FAIRFIELD, PA.

## KNIVES.

Send for Illustrated Catalogue of Full Line.

C. J. KIMBALL COMPANY,  
Bennington, N. H., U. S. A.

CHILLCOTT-EVANS CHAIN CO.,  
MANUFACTURERS OF

High-grade, Hand-made Stud, Crane, Dredge,  
Steam Shovel, Ship, Cable and Wrecker

CHAINS.

CHAINS MADE TO ORDER FOR ALL PURPOSES.

Office, 652 Preble Avenue,

ALLEGHENY, PA.

## High Grade Tested Chain.

For all purposes. Made only from best stock. Certificate of test furnished  
with each shipment. Send us your inquiries.

NICHOLSON & CO., - Pittsburgh Chain Works, Rankin, Pa.  
Works a Hawkins Station, P. R. R.

## What You Need

is a cash system that will enable you to

know  
exactly  
what  
you  
are  
doing.



We will tell you what we have if you will  
write for illustrated catalogue.

HOUGH CASH RECORDER CO.,  
Indian Orchard, Mass., U. S. A.

## JOHN LOYD CO.,

Machine Knives, Shear Blades,  
Presses and Dies.

Mos. 558 to 562 Water Street, New York.



No. 104.

NEW WEDGE POINT.

Dealer's Card on Head in Gross Lots.

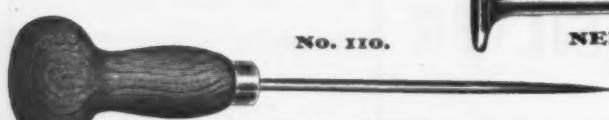
1 3 SIZE.

No. 112.



NEW WEDGE POINT, SPRING PICK.

Dealer's Card on Head in Gross Lots.



No. 110.

NEEDLE POINT.

No. 113.

NEEDLE POINT.

No. 111.



NEW WEDGE POINT, SPRING PICK.

Splits Ice like an Axe.

WALKER'S QUICK AND EASY ICE PICKS. ANTI-RUST NICKEL-PLATED.

Write for 1900 Catalogue and Price List.

ERIE SPECIALTY CO., ERIE, PA., U. S. A.

## SURE!!

You can make more money selling **Bradley Steel Shelf Brackets** than any other kind. They are all right and it pays to show goods that have special features.

These Brackets are light in weight, strong, simple and artistic in design. People more and more appreciate simplicity as an element in the artistic. These Brackets are just as suitable for a conspicuous place as for one that is obscure; the lines and proportions are correct. Customers are interested in these things and respond when they are pointed out. They cannot fail to notice the excellent finish themselves.

The goods cost less to make than any other bracket and are put on the market at a less price. We can make more money by selling a large quantity at a close price than by doing the other thing.

ORDER DIRECT OR THROUGH YOUR JOBBER.

**ATLAS MFG. CO., New Haven, Conn., U. S. A.**

## NEW YORK STAMPING COMPANY,

North 11th and Berry Streets, BROOKLYN, N. Y., U. S. A.

Manufacturers of Pressed and Stamped Steel Ware Specialties. Sole makers of the Eclipse Brand Curry Combs, made of the Finest Cold Rolled Steel, in great variety of styles and sizes, and of superior quality and finish, and salable in all the markets of the world; also makers of Fine Polished Steel Cooking Utensils, including the Famous Acme Frying Pans. Catalogue free on application.



Barrett's  
Glass  
Cutters  
Standard

Barrett's Practical Glass Cutters are the standard the world over. Sold by more Hardware Dealers than all other makes combined. Send for prices and sample. W. L. BARRETT, Manufacturer, Bristol, Conn., U. S. A.

## SUPERIOR SHIP AUGERS AND SHIP BITS.



MANUFACTURED BY

**SNELL MFG. CO.,**

**FISKE DALE, MASS., U. S. A.**

General Agents, J. H. Graham Co., 95 Reade Street, New York. Underhill, Clinch Co., 94 Chambers Street, New York.

## NOTHING BUT SAWS

is what we devote our entire time to making, That's why users prefer them to any other, because they realize all that skill and knowledge can do to make them good will be done.

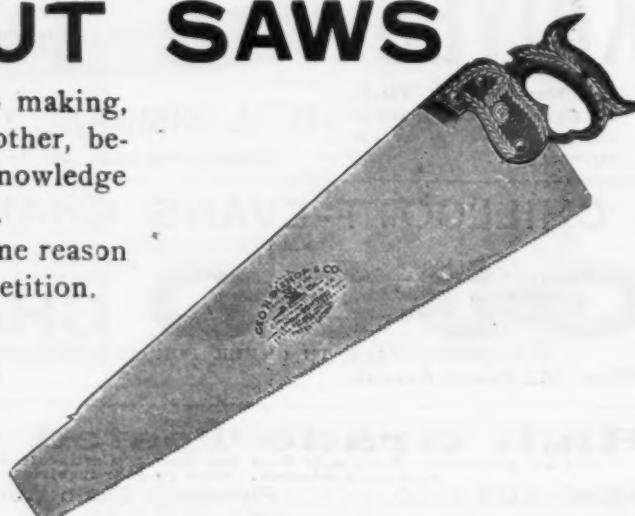
Dealers keep them for sale for the same reason also, because they sell so readily in competition.

## YOURS FOR HAND SAWS,

**GEO. H. BISHOP & CO.,**

CINCINNATI, O., and LAWRENCEBURG, IND.

KEARNEY & FOOT CO., 100 and 102 Reade St., N. Y.  
Salaried Eastern and Export Representatives.





# GOODELL

Reversible No. 22.

**Remember That Goodell Automatic  
Screw Drivers are  
WARRANTED TO SELL.**

Made only by

**GOODELL-PRATT COMPANY, Greenfield, Mass., U. S. A.**



## MEASURING TAPES

Steel, Metallic, Linen, Pocket, Ass Skin, Pat. Leather, Bend and Pressed Leather, etc.



There is not another line of tapes in the market that will equal ours in quality, accuracy, workmanship, neatness and every other way.

**LUFKIN RULE CO., SAGINAW, MICH., U. S. A.**

New York City Office and Store, - 291 STEWART BUILDING.

## STANDARD CHAIN CO.,

PITTSBURGH, PA.

**Hardware Chain, Ship Chain, Railroad Chain.**

**High Grade Chain of all kinds.**

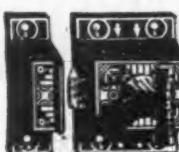
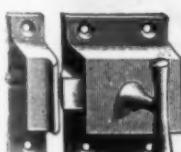
**PROMPT SHIPMENTS.**

**WRITE FOR PRICES.**

## CENTRAL HARDWARE CO.

PHILADELPHIA, PENNA.

**Not in the Combination.**



**MANUFACTURE OF SHELF HARDWARE  
IS OUR SPECIALTY.**

Write for Catalogue and Price List.

Our prices will warrant you in sending us your business.

**Low Prices.  
Quick Delivery.**

## STANLEY RULE & LEVEL CO.,

NEW BRITAIN, CONN., U. S. A.

**Improved Carpenters' Tools.**

SOLD BY ALL HARDWARE DEALERS.

## The MILBRADT ROLLING STEP LADDERS



have the highest recommendation from thousands of customers. They are the handsomest and easiest-running ladders made; work noiselessly, and are absolutely safe and durable. Ladders are made to order and to fit all kinds of shelving, in various styles, to suit all purposes.

Write for  
Descriptive  
Catalogue.

Address

**G. A. Milbradt & Co.,**  
1922 and 1924 N. Broadway, St. Louis, Mo.

Or JOHN CALANDER,  
143 S. 8th St., St. Paul, Minn.

## HARDWARE SHELF BOXES.

Look the matter up. Descriptive circular with list of references and prices mailed on request. We also make a general line of Paper Boxes.  
**THE JENSE JONES PAPER BOX CO.,**  
618 and 617 Commerce St., Philadelphia.

LIVE HARDWARE MEN USE  
PERFECT SHELF BOXES

WE MAKE  
PERFECT SHELF BOXES

WRITE FOR  
CATALOGUE AND PRICES.

**C. P. MOORE,**  
RAVENSWOOD, W. VA.

## WHITE MOUNTAIN FREEZER

The Standard of Excellence Everywhere  
SOLD BY ALL LEADING JOBBERS.  
SEND FOR CATALOGUE.

**THE WHITE MOUNTAIN FREEZER CO.,**  
NASHUA, N. H.

Quickest  
Freezing  
Best  
Results  
Economical  
Durable

## BAR-KEEPER'S FRIEND

WRITE GEO. W. HOFFMAN,  
297 E. Washington St., Indpls. Ind.  
4 FREE SAMPLE.

**U.S. INFALLIBLE METAL POLISH**

## THE BICYCLE STEP LADDER.

Espically adapted for Hardware Stores



The newest, neatest, simplest, easiest operated and safest store ladder made. Highest Award World's Fair. Write for **THE BICYCLE STEP LADDER CO., 65 Randolph St., Chicago, Ill.** Eastern Agent, H. N. YOUNG, 9 Clinton Place, New York City. New York City and vicinity. E. J. HUSSEY & CO., 80 John St., New York City. California, JOHN WOODLOCK, 16-156 First St., San Francisco. Cal. North Western States, HOWE SCALE CO., Portland Ore. Texas and S. W. ED. FOY, Dallas, Tex.

## EASY-ROLLING

IF YOU WANT TO KNOW  
ALL ABOUT THE BEST

## SHELF LADDER

SEND FOR OUR CATALOG TO-DAY  
**MORLEY BROTHERS,**  
123 SOUTH SAGINAW,  
TILDEN STREET, MICH.

## STEEL HARDWARE SHELF BOXES

ANY SIZE TO  
FIT YOUR SHELVING.

SEND FOR CATALOGUE.

**HELLER BOX CO.**  
MONTCLAIR, N.J. U.S.A.

## Cast Brass Butt Hinges

IN STOCK AND FOR SALE BY

**W. & J. TIEBOUT,**

No. 118 Chambers St., New York,

MANUFACTURERS OF

BRASS, GALVANIZED & SHIP CHANDLERY  
HARDWARE.

## IF YOU WANT TO KNOW ASK US

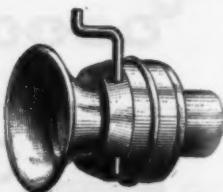
How to file catalogues, quotations and every class of data, with no more trouble to file than to throw in the waste basket, and as easy to get when wanted as though in your vest pocket.

FOLDING PAPER BOX CO., South Bend, Ind.

## W. R. OSTRANDER & CO..

22 DEY STREET, NEW YORK.

Manufacturers of  
Speaking Tubes, Whistles, Oral, Electric, Me-  
chanical and Pneumatic Annunciators  
and Bells.



Complete outfit of Speaking Tubes, Whistles, Elec-  
tric, Mechanical, and Pneumatic Bells. A full line  
always in stock. Send for new catalogue. Factory,  
DeKalb Ave., near Knickerbocker, Brooklyn, N. Y.

## SNOW FLAKE Axle Grease Coach Oil

Manufactured by

**SNOW FLAKE AXLE GREASE CO., 3 Sudbury Street, Boston.**

Fend for our price list and a few facts boiled down.

**T. W. GILBERT & CO., 108 No. 3d Street, Philadelphia, Pa.**

Distributing Agents for Penn., Del., N. J., Md.

## DROP FORGINGS



**WYMAN & GORDON**  
WORCESTER,  
MASS.

# ROTARY FORCE PUMPS



H 704.

WE MAKE THESE FOR PUMPING  
COLD OR HOT WATER, OIL, BEER  
AND ACIDS. Write for Prices.

CISTERNS,  
PIT IRON,  
WIND MILL,  
DA FORCE,  
SET LENGTH,  
HORIZONTAL,  
ANTI-FREEZING  
PUMPS,  
HYDRAULIC RAMS

## WE ALSO MAKE

CAST IRON SINKS,  
SOIL PIPE AND FIT-  
TINGS,  
GARDEN AND FIRE  
ENGINES,  
IRON AND BRASS  
PUMP CYLINDERS,  
PLUMBERS' IRON  
WARE, ETC.

THE HUMPHREYS MFG. CO.,  
Mansfield, Ohio.

CATALOGUE FREE



GET OUR  
REDUCED PRICES

F. E. MYERS & BRO.  
ASHLAND, OHIO.

# PUMPS

WELL  
TANK &  
SPRAY  
PUMPS

HAY CARRIERS,  
FORKS, PULLEYS & C.



# PUMPS

Iron Hand and Wind Mill.

SINGLE and DOUBLE  
ACTING PUMPS  
for all purposes.

CAST IRON SINKS,  
SINK BRACKETS.

SEND FOR CATALOGUE.

The Barnes Mfg. Co.,  
MANSFIELD, O.



# STAR WIND MILLS,

All Kinds and Sizes.  
"Hoosier" and "Fast Mail" Iron Pumps.

Secure the Agency for 1901.

Galvanized Steel Star Back Geared Wind Mills.  
Galvanized Steel Star Direct Stroke Wind Mills.  
Galvanized Steel Power Wind Mills.

Wood Star Wind Mills.

Water Tanks, Wood or Steel.

Tabular Well Tools, Valves, Tubular Well Points, Drive Well Points, Working Barrels, Hose and Hose Goods, Pipe and Fittings, Hydrants and Street Washers, all kinds of Water Supply Goods.

Estimates and advice furnished on Steel Sub-Structure work of all kinds.

Largest and finest equipped factory in America for this class of goods.

Inquiries respectfully solicited. Catalogue with discount sheet mailed on application. Address

FLINT & WALLING MFG. CO., 50 Oak St., Kendallville, Ind.



# Red Jacket

## SPRAY PUMP

IS THE BEST  
FOR GENERAL USE.

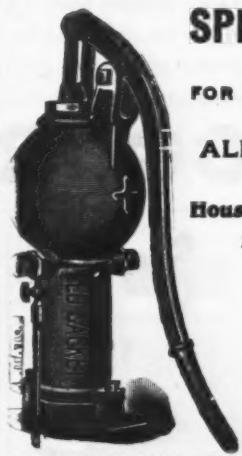
WE MAKE  
ALL KINDS OF  
PUMPS,

House Force,  
Set Length,  
Deep and  
Shallow Well.

ALSO  
HAY TOOLS.

Get Our Prices.

RED JACKET MFG. CO., - Davenport, Iowa.



Nickel Plated Brass, Suc-  
tion and Force House

## PUMPS

Strong, Light, Durable.

Send for Catalogue.  
ATHOL PUMP CO.

Athol, Mass., U. S. A.

COPPER,  
FORCE,  
WELL,  
CISTERNS,  
and  
AIR CHAMBER

## PUMPS.

S. WILDER & CO.,  
HOLLISTON, MASS., U. S. A.

Send for catalogue and prices.

**FORGINGS**  
Carriage, Bicycle and Special.

Correspondence Solicited.

E. D. CLAPP MFG. CO.,  
AUBURN, N. Y.

**EDSON'S ODORLESS EX-  
CAVATING OUTFITS FOR  
VAULTS AND CESSPOOLS.**

This system is used extensively in this country and under the direction U. S. Military Government abroad.

Send for Illustrated booklet.

EDSON MFG. CO.,

134 Commercial St., Boston, Mass., U. S. A.

## AMERICAN SCREW CO.,

## SCREWS

MANUFACTURERS OF  
SCREWS, TIRE BOLTS, STOVE  
BOLTS, RIVETS AND BURRS,  
WIRE NAILS AND - - - - -



KINDRED ARTICLES IN ALL VA-  
RIETIES OF FORM AND FINISH,  
BOTH REGULAR AND SPECIAL.

PROVIDENCE, R. I., U. S. A.

**A** Ladd's Discount Book is a practical means of rapidly reaching absolutely accurate results without the mental wear of computing. It gives at a glance the net of any sum at a great range of discounts, simple and complex, and it is accurate, rapid and practical. Price, \$8.00; Double Indexed Edition, \$4.00.

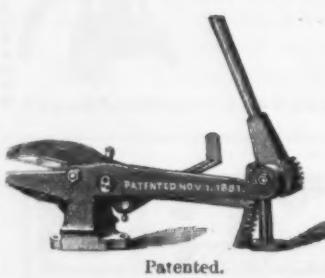
**ACCURATE AND RAPID.**

Mailed, postpaid, upon  
receipt of price by  
DAVID WILLIAMS CO.,  
232-238 William St.,  
New York.



**Reliable**  
VAPOR STOVES,  
GAS RANGES,  
STEEL RANGES.  
THE SCHNEIDER & TRENKAMP CO.,  
Chicago, Illinois. Cleveland, Ohio.

### “Eureka” Patent Shear.



Patented.

The most effective implement for cutting wire rods and strip metal.

Should be kept in stock by every hardware dealer.

**SIMPLE. DURABLE. STRONG. CHEAP.**

Made in two sizes:

**No. 1** cuts round metal up to  $\frac{1}{4}$  inch.

cuts sheet metal up to  $\frac{3}{8}$  inch.

**No. 2** cuts round metal up to  $\frac{1}{2}$  inch.

cuts sheet metal up to 3-16 inch.

**THE SMITH & EGGE MFG. CO.,**  
BRIDGEPORT, CONN.



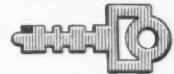
**Padlocks.**  
Over 300 Numbers.

**"S. B. CO."**  
**Night Latches.**  
Popular Sellers.

**Door Locks**  
Rim and Mortise.  
Leading Sellers.

S. R. SLAYMAKER, Sole Manufacturer, LANCASTER, PA., U. S. A.

Large Stocks. Prompt Deliveries. Special Locks Accurately and Promptly Made.



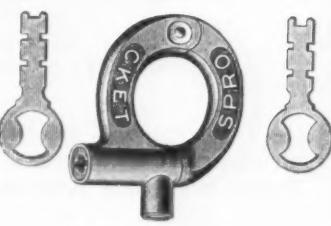
Catalogue and Attractive Prices on Request.

SOLE SALES AGENTS,

**JOHN H. GRAHAM & CO.,**

113 Chambers Street,

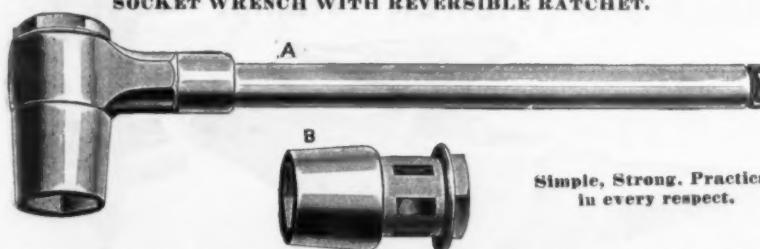
NEW YORK, N. Y.



**KEYSTONE MANUFACTURING CO**  
**MACHINE TOOLS, RATCHET DRILLS, WRENCHES.**

Only first-class material used in the manufacture of these tools. Perfect Mechanical Construction, High-grade Finish.

**SOCKET WRENCH WITH REVERSIBLE RATCHET.**



Simple, Strong, Practical  
in every respect.

The body of this Wrench is made of Drop-forged Steel. The Nut Socket, cut "B," is Steel; the handle "A" of Bar Steel, insuring the greatest possible strength. The Ratchet is entirely enclosed, preventing dirt or other obstacles interfering with its working. Can be made reversible instantly by simply withdrawing the knob at end of handle and making a half turn.

**RATCHET STUD DRIVER, OR TAP WRENCH, WITH REVERSIBLE RATCHET.**



This tool consists of holder, socket and stud nut. Indispensable in a Machine Shop. Useful for Boiler Makers, Plumbers, and Steam Fitters' Work. For general utility and economy is without equal.

Send for  
Catalog.



New York Office,  
ALDER & BOYD, 37 Warren St.

**NAIL SETS.**  
**KEYSTONE MFG. CO., BUFFALO, N. Y.**



**A NEW TOOL.**  
**THE "IDEAL"** ALL BALL BEARING CLAMP

For Machinists, Model and Pattern Makers.  
The Handiest and Most Perfect Clamp.

THOS. HALL, 10 Water Street, BROOKLYN, N. Y.

You will like

**PRATT'S CONE  
BELT SHIFTER**

SAVES time to the manufacturer, trouble to the operator, and wear to the belts.

Send for Circular.

CHANDLER & FARQUHAR,  
Boston, U. S. A.



**The STAR HEEL PLATE CO.,**  
SOLE MANUFACTURERS OF  
STAR AND BOSTON  
HEEL PLATES,

**STAR  
LASTS  
AND**

Made in 5 sizes.

Made in 4 sizes.

Patent Reversible Iron Standards,  
Oval, Chisel, Star and Square Top

**IRON STANDS,**

Shoe Repairing Outfits, Lap Lasts,  
Hob Nails, and a Full Line of  
Shoe Repairing Supplies.

Address **LOUIS SACKS,**  
63-81 Polk St., Newark, N. J.

WRITE FOR PRICES....



## WIEBUSCH &amp; HILGER, Ltd.,

9-15 Murray Street, New York.

San Francisco Office, 105 Front Street, HUGHSON &amp; MERTON.

## MANUFACTURERS' AGENTS AND IMPORTERS.

## SOLE AGENTS FOR

Essex Horse Nail Co.,  
Horse Shoe Nails.Clark & Parsons Co.,  
"Lightning" and "Maine" Hay Knives.Challenge Cutlery Corporation,  
Successors to Hatch Mfg. Co. and The Challenge Razor Works.  
Razors and Farriers' Knives, Pocket  
Cutlery, Etc.

"Seymour" Shears and Scissors.

Pope's Farriers' Knives.

Taintor Mfg. Co.,  
Taintor Positive Saw Sets.Press Button Knife Co.,  
Press Button Knives.Hilger & Sons,  
German Hardware and Cutlery.Isaac Nash,  
Genuine T. Waldron Scythes.American Shearer Mfg. Co.,  
Priest's Hand and Power Horse and  
Toilet Clippers.Ferro Carbon Castings Co.,  
"Rex" Hammers and Hatchets.Eyeless Tool Co.,  
Eyeless Picks and Tools.Higginson Hardware Co.,  
"Acme" Nippers.New York Stencil Works,  
Steel Letters and Figures.Needham Bros., Ltd.,  
"Repeat" Cutlery and Sheffield Goods.Burgen & Wilkinson, Ltd.,  
Sheep and Garden Shears.

## NEW YORK MANUFACTURERS' HEADQUARTERS FOR

Bridgeport Chain Co., Chesterman's Tapes, Roses' Trowels,  
Peter Wright's Anvils, Hoffman's Steels, Brades' Trowels,  
Wade & Butcher Razors and Tools.

Warranted Better than the Best

## ENGLISH ANVIL

Face in one piece of BEST TOOL CAST STEEL, PERFECTLY WELDED, perfectly true, of hardest temper, and never to come off or "settle." Horn of tough untempered steel, never to break or bend. Only Anvil made in the United States fully warranted as above.

## FISHER DOUBLE-SCREW VISE

IS FULLY WARRANTED STRONGER THAN ANY OTHER LEG VISE, AND ALWAYS PARALLEL. Is the best Vise for Machine Shops and Blacksmiths, and for all heavy work. ACCURATE AND DURABLE. Send for Circular.

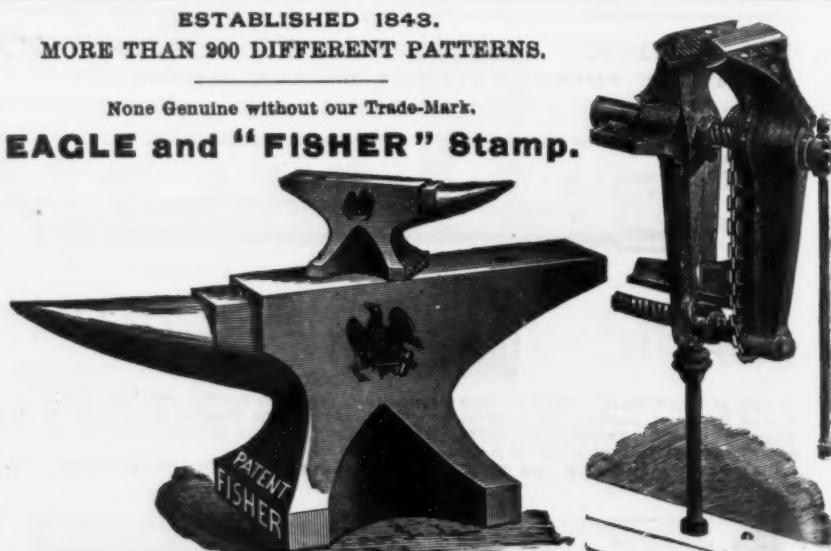
## EAGLE ANVIL WORKS, Trenton, N.J.

Sold in New York by our Agents, J. C. McCarty & Co., 10 Warren St., The Russell & Erwin Mfg. Co., 45 Chambers St.

ESTABLISHED 1843.  
MORE THAN 200 DIFFERENT PATTERNS.

None Genuine without our Trade-Mark.

## EAGLE and "FISHER" Stamp.

THE DROUVE  
VENTILATOR

The best and cheapest Ventilator on the market. Made in all sizes. Send for catalogue and prices.



THE G. DROUVE  
COMPANY,  
Bridgeport, Conn.

Skylight and  
Sheet Metal Work.



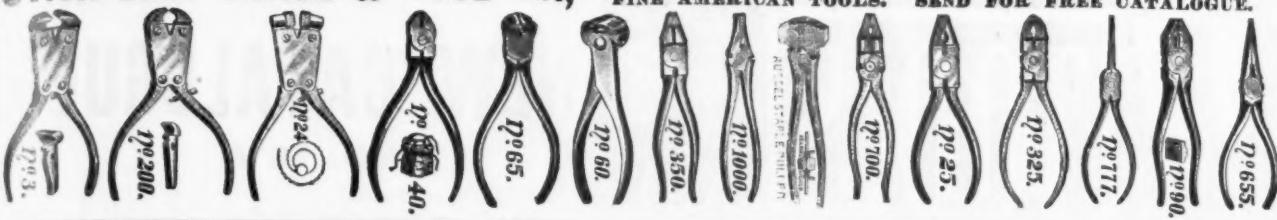
## COMBINATION WRENCH.

This wrench not only combines the superior qualities of a Gas Pipe Wrench, but also all the requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.

For Circulars and Price-List, address

Bemis & Call Hardware & Tool Co., Springfield, Mass., U.S.A.

**UTICA DROP FORGE & TOOL CO.,** N. Y. Office, 296 Broadway, N. Y. City. Factory, Utica, N. Y., U. S. A.  
FINE AMERICAN TOOLS. SEND FOR FREE CATALOGUE.



**SMITH & HEMENWAY CO. 296 Broadway, NEW YORK.**

Also Nippers and Pliers, Nail Pullers, Splicing Clamps, Climbers, Wire Clamp Pullers, Can Openers, Pruning Shears, all kinds of Knives, Shears, Snips, etc.



Importers of John Engstrom's Swedish Razors, the Ran-tan-ka-rus (Little Red Devil) Razors, Sterling and Bo-ras-ic Brands of Razors, Town and Anchor Brand of Razor Strops, Kazor Strop Paste, Hones, etc.

Send for **OVER 30 DIFFERENT PATTERNS OF GLASS CUTTERS.** Catalogue.

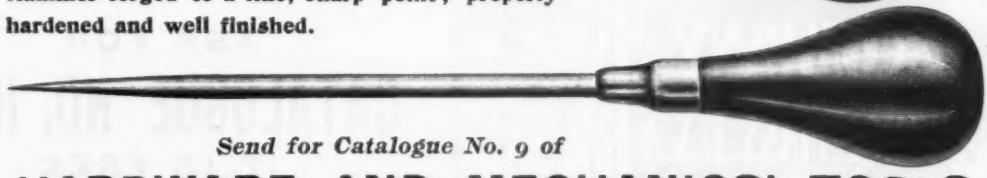
**MAYHEW'S SCRATCH AWLS.**

No. 1040.



Length of  
Blade, 4 1/4  
inches.

No. 1020.



Length of  
Blade, 5 1/2  
inches.

Send for Catalogue No. 9 of

**HARDWARE AND MECHANICS' TOOLS.**

**H. H. MAYHEW CO.,** = = = *Shelburne Falls, Mass., U. S. A.*

**PATENTED ARTICLES**

—OF—

**Malleable Iron**

Hammer's Malleable Iron Hand Lamps.



SCREW, KEROSENE SIZE.

Hammer's Adjustable Clamps.

Hammer's Malleable Iron Oilers, 3 Sizes

Hammer's M. I. Hanging Lamps.

**NEW** PATTERN HEAVY SCREW CLAMPS, Strongest in the market.

For sale by all the principal Hardware Dealers.

SEND FOR PRICE-LIST.

**MALLEABLE IRON CASTINGS,**

of superior quality, and Hardware Specialties in Malleable Iron made to order.

**HAMMER & CO.,**  
BRANFORD, CONN.

**AN Elementary Treatise on Orthographic Projection.** Being a new method of teaching the science of mechanical and engineering drawing. By W. BIRKIN. Thirteenth edition. 108 pages, cloth..... \$1.50

or sale by David Williams Co., 232 William St., N.Y.

**COES  
WRENCHES.**

The Genuine Improved  
**KNIFE HANDLE**  
PATENTED.

**SCREW WRENCHES.**



Warranted to be the **BEST MADE** and  
**STRONGEST WRENCH** in the **MARKET.**

Has a straight bar and extra long nut for  
screw in jaw.

Send for Circular  
and Prices.

**COES WRENCH CO.,**

Worcester, Mass.

New York Agents:  
J. C. McCARTY & CO.,  
JOHN H. GRAHAM & CO.



**THE ATLAS PATENT PIPE WRENCH.**

A HIGH CLASS DROP FORGED STEEL TOOL.  
QUICK, EFFECTIVE and POSITIVE in adjustment. The good qualities of Chain Pipe Wrench and Screw Pipe Wrench combined without having the faults of either.

Write for Discounts and Circular.

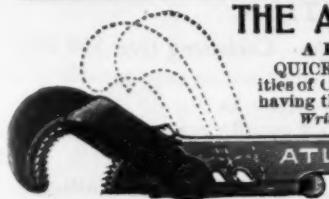
ATLAS PAT. 1888

Atlas Pipe Wrench Co.

121 Liberty Street,

New York.

51 Flood Bldg., San Francisco, Cal.





# TOOLS

THE L. S.  
STARRETT  
COMPANY  
ATHOL, MASS., U.S.A.



## NEW CATALOGUE NO. 16 A

**NEW TOOLS**—Combination Squares with hardened blades; new style Combination Square, No. 17; Carpenters' Square; Center Square; Pocket Slide Caliper; Micrometer Gauge No. 24, 12 to 36 in.; Micrometers with finger ring; Micrometers with ratchet stop; Attachment for converting a 2 in. into a 1 in. Micrometer; Micrometer No. 127, 0 to 12 in.; Inside Micrometer, 32 to 107 in.; Thickness Gauge, No. 172; Inspectors' Gauges; Little Giant Jack Screws; Complete line of Hack Saws; Universal Surface Gauge, No. 57; Screw-adjusting Calipers; Double Calipers; Carpenters' Dividers, No. 92; Stair Gauge Fixtures, No. 111; Trammels, No. 59; Drill and Tap Gauges.

ASK FOR  
**CATALOGUE NO. 16 A**  
IT IS FREE

### THE DIAMOND HACK SAW FRAME.



Nickel Plated, highly finished, with blade, \$9.00 per dozen. Sizes: 8 in., 9 in., 10 in., 12 in.

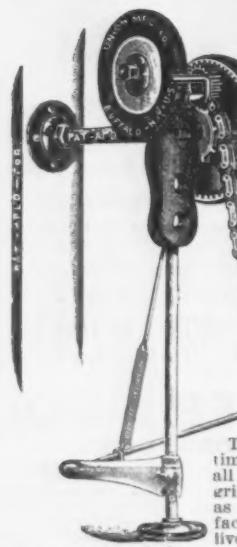
SEND FOR CIRCULARS OF  
**MACHINISTS' SMALL TOOLS,**

Spring Belt Punches, Saddlers' Punches, Centre Punches, Nail Sets, Etc.

**SPRINGFIELD MACHINE SCREW CO.,**  
Springfield, Mass., U. S. A.

CHICAGO, 36 La Salle St.

### UNION KNIFE AND TOOL GRINDER.



All Cut Gear  
Driven.

New Positive  
Ball Ratchet  
Clutch.

$\frac{5}{8}$  Steel Shaft.  
Cone Bearings.  
Best make of  
Emery Wheel  
6 x  $\frac{3}{4}$ .

Speed from 2000  
to 4000 attained.  
Every machine  
warranted.  
Our capacity 100  
per day.  
The price  
is right.

This machine saves files,  
time and money, used in  
all places where light  
grinding is required, such  
as bicycle machine shops,  
factories, mills, etc. All  
live wholesalers handle  
them. Made only by

UNION MFG. CO.,

247 GRANT STREET,

BUFFALO, N. Y.

### Cronk's Combination Fencing Plier and Staple Puller.



Made of forged Steel. Indispensable to builders and for repairing wire fence. Send for our new catalogue showing complete line of **Pliers, Barn Door Hangers, Track, Stays, Rakes, Pruning Shears and other Hardware Specialties.**

**CRONK HANGER CO., Elmira, N. Y.**

### The Standard Hardware Lists For Pocket, Desk and Price Book Use. ELEVENTH EDITION.

**Revised to Date of Purchase. Enlarged to 129 Pages. Containing Over 300 Lists.**

These lists are printed on thin paper of good quality and on only one side of each page, so that they may be cut out and inserted in price books.

The Standard Hardware Lists is an indexed book equally convenient for purpose of reference.

**BOUND IN FLEXIBLE CLOTH COVER. PRICE, ONE DOLLAR, POSTPAID.**

DAVID WILLIAMS COMPANY, Publishers, 282-288 William St., N. Y.

## EAGLE



Standard  
Factory  
Brands  
of the  
NICHOLSON  
FILE CO.,  
and  
warranted  
by them.

## AMERICAN



## McCLELLAN



## GREAT WESTERN

Guaranteed  
to be  
Superior  
to any  
Competing  
Brands.

"BEST BY TEST."

"HELLER'S"

THE WORLD'S STANDARD.

## Horse Rasp, Files and Farriers' Tools

Have been steadily IMPROVED in manufacture, kept constantly up to date and abreast with the TIMES. Their SUPERIOR QUALITY sets a known and tested STANDARD of EXCELLENCE. Made from OUR OWN PRODUCTION of SPECIAL REFINED CLAY CRUCIBLE CAST STEEL and manufactured under machines of OUR OWN PATENTED CONSTRUCTION as well as TEMPERED by a SECRET PROCESS.



ADJUSTABLE HORSE TOOTH RASP.

NEW 1900 CATALOGUE MAILED FREE ON APPLICATION.

HELLER BROTHERS CO., {Established 1836  
Incorporated 1899} Newark, N. J., U. S. A.

## "HAY-BIDDEN" Solid Wrought Anvils.

FIRST MADE IN  
AMERICA.

Fully Warranted.

America for Americans.

Why use a foreign Anvil when you can get one of American manufacture, which is Superior in Quality, Form and Finish to any imported? For sale by all dealers.

Received Gold Medal, Highest Award for Anvils at Omaha, 1898.

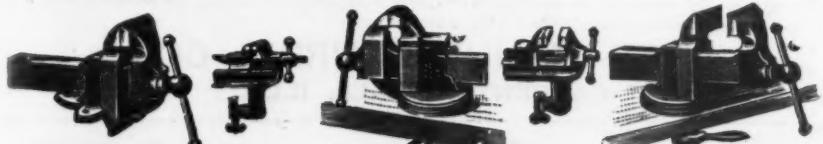
HAY-BIDDEN M'F'G CO.,

254 NORTH HENRY ST.,  
BROOKLYN, N. Y.

Die and Steel Forgings.  
Weldless Rings.  
Forged Tool Steel  
Spinning Chucks

Superior to steel castings.

Our steel is made expressly and solely for us. Dies forged under our system will cut 10 to 25% more blanks than others before regrinding.



ATHOL MACHINE CO.,  
Athol, Mass., U. S. A.

Manufacturers of

Vises, Meat Choppers,  
Mechanics' Fine Tools, &c.  
Send for Catalogue.



## FOUNDRY LAMP.

MADE OF  
CAST IRON, FOR  
Shops, Steam-  
boats and  
Factories of all  
kinds.



MADE BY  
THE  
Forest City  
Foundry & Mfg. Co.  
Cleveland, O.  
Makers of Fine Light Gray Iron Castings.

# The World's Greatest File Works.

ESTABLISHED 1842.



THE ARCADE FILE WORKS at Anderson, Indiana, is the largest and most completely equipped plant for the manufacture of Files in the world.

The highest inventive genius and mechanical talent has been concentrated on ONE Modern Plant, which is directed by master minds—originators of a distinctly improved product—machinery and methods up-to-date.

Back of an Arcade File stands this guarantee: That our Arcade File will cut faster and wear longer than any other file on the market, and as an "earnest" of this guarantee, The Arcade File Works will send to any responsible Hardware Jobber, Wholesaler or Retailer, one dozen Arcade Files, to become the property of the receiver or returned at our expense if the guarantee is not fully borne out in every particular.

NEW YORK CITY, 97 Chambers St., 79 Reade St. WORKS, ANDERSON, IND. CHICAGO, 118 Lake Street.

Severance  
Centering Tool,  
PRICE \$2.00

Combination  
Center Drills,  
PRICE \$1.50 PER DOZ.

With these two tools you can center your work in two operations. It requires at least four in the old way.

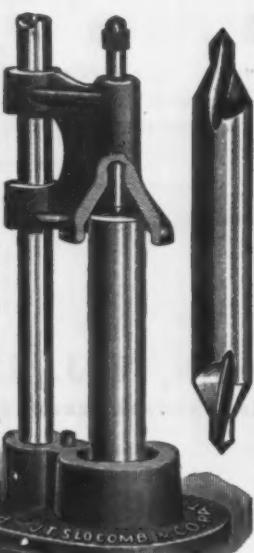
Our Catalog for the asking.

J. T. Slocomb & Co.,

PROV.,

R. I.

Chas. Churchill & Co., London, Eng.



LE COUNT'S  
"DOUBLE TAIL" LATHE DOG.

Manufactured by

WM. G.

LE COUNT,

Successor to C. W. Le  
Count,  
South Norwalk, Conn.



Send for Catalogue  
"B" showing full  
line of

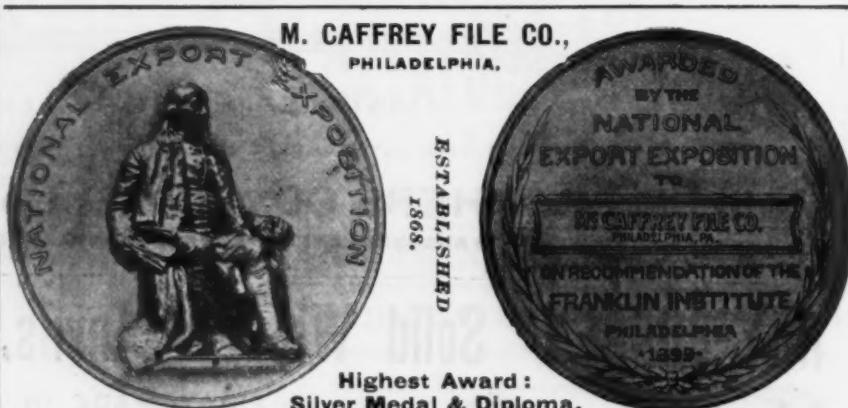
Machinists'  
Tools.

READ'S FLUSH FACE  
STOP CHOCKS and  
WASHERS make a per-  
fectly smooth finish on  
Window and Door Stops.  
Also for Marble and Tile  
Fasteners. Send for sam-  
ple of our sash spring.

A. P. READ & CO.,  
Manufacturers.  
14 and 16 No. Canal St.,  
Chicago, U. S. A.



Sole manufacturers of the celebrated  
STOKES BROTHERS HORSE RASPS AND ST. CRISPIN SHOE RASPS  
**STOKES BROS. MFG. CO.,**  
FREEHOLD, N. J., U. S. A.



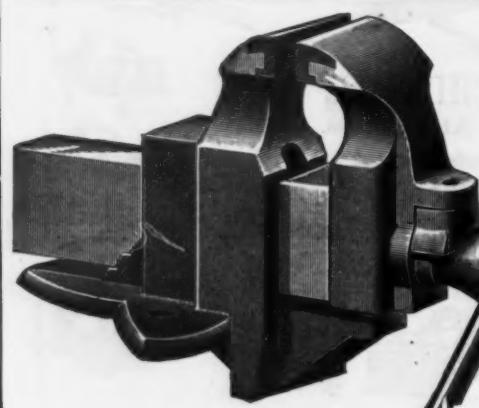
Highest Award:  
Silver Medal & Diploma.

## THE ELGIN WRENCH.



The best general purpose wrench on the market. It will turn a nut, hold a pipe or twist a rod. It is not clumsy, but flat and neat. It is the only adjustable wrench (with its range of work) that can be conveniently carried in the pocket. When jaws wear out, old ones can be replaced with new. Nickel plated and perfectly constructed. Write us for prices.

**STAR MANUFACTURING CO.,**  
CARPENTERSVILLE, ILLS.



## VISES.

SEND FOR  
CATALOGUE.

**HOWARD IRON WORKS,**  
BUFFALO, N. Y.

Also Manufacturers of Passenger  
and Freight Elevators. Electric, Hy-  
draulic and Hand Power.

# BLACK DIAMOND FILE WORKS,

Established 1863. Incorporated 1895.

Twelve Medals of  
Award at  
INTERNATIONAL  
Expositions.



**G. & H. BARNETT COMPANY,**  
PHILADELPHIA, PA.

**J. M. KING & CO.,**  
WATERFORD, N. Y.



Established by DANIEL B. KING, 1839.

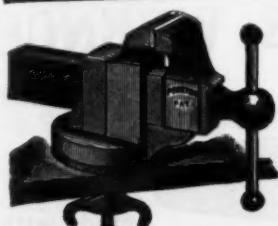
Special Grand Prize  
GOLD MEDAL,  
Atlanta, 1895.

Manufacturers of  
**BUTTON'S**  
**Pat. Wire Cutter**  
**AND PLIER COMBINED.**

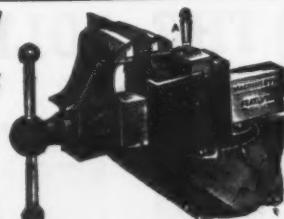
Specially Adapted for Use on Wire Fence.

Also manufacturers of BLACKSMITHS and  
MACHINISTS' STOCKS and DIES, PLUG and  
TAPER TAPS, HAND, NUT and SCREW TAPS  
PIPE TAPS and REAMERS.

Price-List on Application.



We make all  
kinds and sizes  
of Vises.



Descriptive Catalogue Free.

PRENTISS VISE CO., - 44 Barclay Street, New York.

Sole Agents for Great Britain: CHAS. NEAT &amp; CO., 112 Queen Victoria St., London, E. C.

## LEWIS PATENT QUICK-ACTING VISE



DURABLE, POWERFUL  
and TENACIOUS  
as any Screw Vise.

Commence to draw as soon as  
lever is started and have suffi-  
cient gether for any kind of  
work.



Send for Illustrated Catalogue.

Lewis Tool Co., 44 Barclay St., New York.



HOLLANDS MFG. CO.

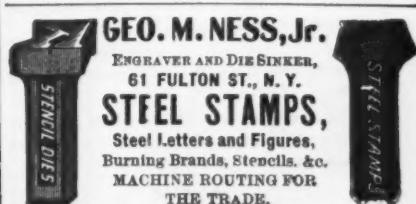
ERIE PA.



Decided improvement. Less friction. Can be  
changed from a roller to a three-wheel cutter.  
Extra wheels in the handle. Send for catalog.  
TRIMONT MFG. CO., Roxbury, Mass., U.S.A.

**L. A. ECKER STAMP WORKS.**  
LITTLE FERRY, Bergen Co., N. J.

Die Sinkers, Steel  
and Brass Stamps,  
Seals, Stencil Dies  
for Stencil Cutting.  
Die Letters, Stamping Letters, Brands,  
Badges and Medals, Key Checks, Door and Name  
Plates, Experimental Work, etc.

**GEO. M. NESS, Jr.**ENGRAVER AND DIE SINKER,  
61 FULTON ST., N. Y.**STEEL STAMPS,**Steel Letters and Figures,  
Burning Brands, Stencils, &c.  
MACHINE ROUTING FOR  
THE TRADE.

THE Taintor Positive Saw.

Set No. 90 has every good  
point possessed by any  
other saw set, besides a  
number peculiar to  
itself.  
TAINTOR  
MFG. CO.

Wiebusch & Hilger, Ltd., Agents,  
9 to 15 Murray St., NEW YORK.

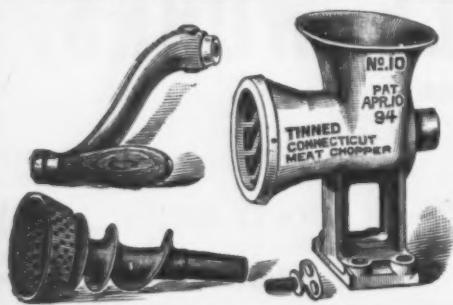
Hand Elevators and  
Dumbwaiters

Made to be sold by the Hard  
ware trade. Can be placed in  
position by any carpenter. Cat-  
logue free.

ENERGY ELEVATOR CO.,  
408 Cherry St., Phila., Pa.

SCHERDTLE & SIEBERT,  
STEEL STAMPS & DIES—  
SEALS—MACH PLATES—CHECKS—  
BRIDGEPORT, CONN.

## CONNECTICUT MEAT CHOPPERS



In three sizes, 8, 10, 12. For Butchers, Marketmen, Farmers, Poultry Breeders, Hotels, Restaurants and Public Institutions. For smaller sizes order "THE NEW CONNECTICUT," No. 20, 40, 60.

New York Office,  
W. H. JACOBUS,  
No. 90 Chambers St.

ONLY  
TWO  
PARTS  
TO  
CLEAN

C. M. AVERY & CO.,  
Direct Representatives,  
165 Lake St., Chicago, Ill.

## THE NEW CONNECTICUT CHOPS and PULVERIZES.

Housekeepers can now  
DO IT ALL with a - - -  
SINGLE MACHINE.



DOES  
IT  
ALL

FOOD  
No. 2.  
MEAT  
No. 1.  
PEANUT BUTTER,  
CHOCOLATE,  
No. 3.  
VEGETABLES,  
FRUITS,  
CLAMS,  
HASH, ETC.  
DATES.  
COCOANUT,  
CRACKERS, ETC.

ONLY TWO PARTS TO CLEAN.

Manufactured by  
O. D. WOODRUFF,  
Pottstown, Pa.

## The Peoria Washers



are the strongest, best made machines for the purpose on the market to-day. They have *Cedar Tubs* with *Galvanized Hoops*. Inside castings, *Tinned Malleable Iron*. Leg brackets, malleable iron and bolted to tub with *Tinned Bolts*. Will wash as well as by hand, with less than  $\frac{1}{2}$  the labor.



Manufactured by

CLARK, QUIEN & MORSE,  
402 S. WASH. ST., PEORIA, ILL.

## Loss of Time

on the part of employees is often less due to dishonesty on their part than to lax methods on the part of employer.

## One way--the surest way--

to prevent this loss is to install Simplex Time Recorders throughout the shops.

jt jt jt

THE LANG & GOODHUE MFG. CO., Engineers and Machinists, Burlington, Vt., say of this device: "It has inculcated punctuality in our entire force."

HIBBARD, SPENCER, BARTLETT & CO., Chicago, Ill., write us: "This system is saving us money."

THE PORT CHESTER BOLT & NUT CO., Port Chester, N. Y., say: "It is the best thing of its kind we have ever seen."

jt jt jt

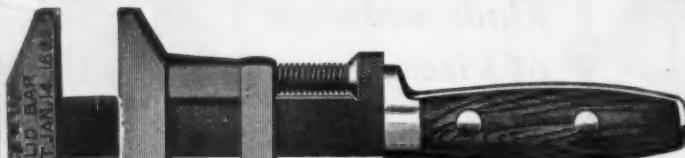
Is everything "good enough" in your system of keeping time? If not, let us hear from you.

jt jt jt

SIMPLEX TIME RECORDER CO.,  
GARONER, MASS., U. S. A.

(Successors to Time Recorder Dept. of Heywood  
Bro. & Wakefield Co.)  
272 Wabash Ave., Chicago, Ill.  
N. E. Agents, Moore & Booth, 170 Summer St.  
(Opp. So. Station), Boston, Mass.

## THE SOLID HANDLE WRENCH.



By actual tests the Strongest Wrench made.

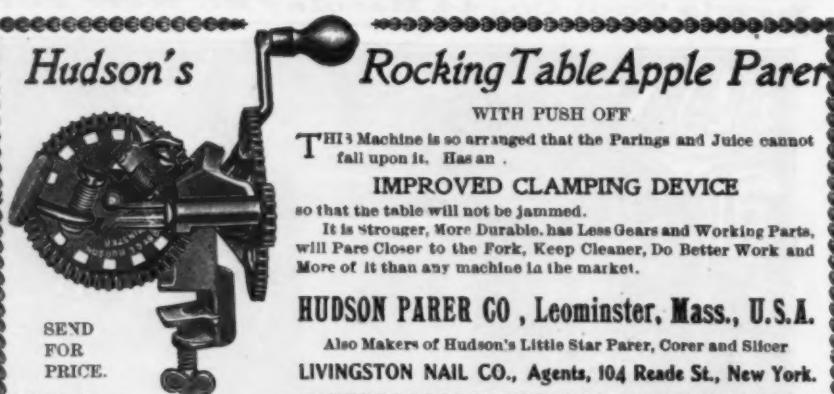


This entire piece one solid steel forging.  
Every Wrench Warranted.

Manufactured by  
THE PECK, STOW & WILCOX CO.,  
Southington, Conn.,  
and New York, U. S. A.  
Send for Circulars and Prices.

THE ONLY  
Screw  
Wrench  
made with  
the bar of  
ONE PIECE,  
thus  
securing  
greatest  
possible  
strength.

## Hudson's



## Rocking Table Apple Parer

WITH PUSH OFF

THIS Machine is so arranged that the Parings and Juice cannot fall upon it. Has an

## IMPROVED CLAMPING DEVICE

so that the table will not be jammed.

It is Stronger, More Durable, has Less Gears and Working Parts, will Pare Closer to the Fork, Keep Cleaner, Do Better Work and More of it than any machine in the market.

HUDSON PARER CO., Leominster, Mass., U.S.A.

Also Makers of Hudson's Little Star Parer, Corer and Slicer

LIVINGSTON NAIL CO., Agents, 104 Reade St., New York.

BIGELOW  
WIRE FLY KILLER.

A Quick Seller.  
Good Profits.

Trade sample on application  
"Mamma says she wouldn't  
keep house without the  
FLY KILLER."

J. P. BIGELOW, Mfr.  
Worcester, Mass.

THE "KING" FLY KILLER. Pat'd Jan. 9, 1900.  
KILLS without crushing, and no danger of soiling  
finest fabrics.

KING FLY KILLER is almost invisible, so flies  
are quickly killed.

Manufactured by  
R. R. MONTGOMERY & CO., Decatur, Illinois.



Sample free to dealers.

# Enterprise

PATENTED  
HARDWARE  
SPECIALTIES

Rapid Grinding and Pulverizing Mills



No. 2, \$4.50



No. 5, \$8.00

50 Sizes & Styles for Hand & Power from \$1.25 to \$125.00

Meat and Food Choppers



No. 12, \$2.50



No. 1, \$1.25



No. 5, \$2.00

50 Sizes & Styles for Hand & Power from \$1.00 to \$275.00

Fruit, Wine and Jelly Press



No. 34, \$3.00

Bone, Shell & Corn Mill



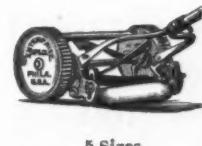
No. 750, \$7.50

Lawn Sprinkler



No. 1, \$3.50

Lawn Mowers



5 Sizes  
7, 9, 11, 13 and 15 inches

Meat Juice Extractor



No. 21, \$2.50

Cold Handle Polishing Irons



No. 82, \$6.75 per doz.

Descriptive Catalogue Free

ORDER FROM YOUR JOBBER

The Enterprise Mfg. Co. of Pa.

Philadelphia, Pa., U. S. A.

N. Y. Branch: No. 10 Warren Street

## Gray Flint Enamelled Ware

Manufactured by

**KEEN & HAGERTY MFG. CO.,**

Main Office and Salesroom, 16 West Baltimore St., Baltimore, Md.

New York Salesroom, 51 Cliff street.

Chicago Salesroom, 1115 Chamber of Commerce.

Philadelphia Salesroom, 116 Market Street.

San Francisco Salesroom, 123 California St.

We make all descriptions of Pieced, Heavy Polished, Stamped, Japanned and Gray Flint Enamelled Ware.



Write for Illustrated Catalogue, No. 42,  
showing FULL LINE

## "BROWN" COW TIES.

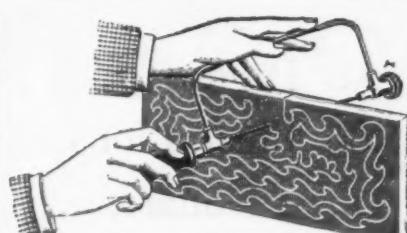


Our Cow Ties are unquestionably the most reliable and attractive stable fixtures that this or any other country can produce. Every part is made from best grade of steel and by patented **WELDLESS PROCESSES.**

THEY WILL PLEASE YOUR CUSTOMERS.

Manufactured only by

**THE BRIDGEPORT CHAIN CO.,** Bridgeport, Conn.



**Jones Ratchet**  
**COPING SAW.**

Can be quickly set at any angle. Well made, low in price. Send for circular.

**JONES & DOMMERSNAS,**  
31 and 33 Indiana St., - - - CHICAGO.

# SEWING MACHINES ARE A PROFITABLE SPECIALTY FOR THE HARDWARE TRADE...

With those who have pushed them well they have become really a staple with special profit; and the trade is awaking to the fact that

THEY  
CONSTITUTE  
A  
PARTICULARLY  
DESIRABLE  
LINE  
TO  
HANDLE.



FITTED WITH BALL BEARINGS.

We manufacture high quality goods in largest quantities. Have been at it for twenty years.

We supply more of the trade than all other makers combined.

The Hardware Trade is our specialty.

Correspondence Solicited.

**NATIONAL SEWING MACHINE CO.,** FACTORY and HOME OFFICE, **Belvidere, Illinois.**

## NEW IDEAS.

THE AMERICAN HARDWARE STORE illustrates and describes the best methods that ingenuity and experience can devise for Store Arrangement, Accommodating Hardware, Effective Display of Stock and matters of vital importance to dealers.

450 Pages.

500 Illustrations.

Three Dollars.

David Williams Company,

Publishers,

232-238 William Street, New York.

## DEALERS

Wanted in every town to handle the best selling and most complete line of

## VARNISHES

IN THE MARKET

### SPECIAL INDUCEMENTS

FOR PARTICULARS APPLY TO

## STANDARD VARNISH WORKS

THE LARGEST VARNISH WORKS IN THE WORLD.

Factories covering 7 Acres, ELM PARK, STATEN ISLAND, N. Y.

GENERAL OFFICES.

CHICAGO  
2620 ARMOUR AVE.

29 BROADWAY.  
NEW YORK.

LONDON  
23 BILLITER ST.



## Cannon Oilers.

COMBINES Quickness, Economy and Conveniences indispensable to Manufacturers, Engineers and Farmers. Will save one-third of the oil; can use any weight oil in any position. Made in all sizes from a half pint to a half gallon. Use one once and you will use no other.

Write for Prices and Circulars.

STOUTENBURG MANUFACTURING CO.,  
Keithsburg, Ill.



THE LARGEST LINE OF  
Ice Tools and  
Lemon Squeezers

MADE IN THE UNITED STATES

ARE MANUFACTURED BY

**A. C. WILLIAMS,**  
RAVENNA, OHIO, U. S. A.,

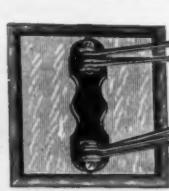
To whom send for catalogue of  
House Furnishing Specialties  
and Hardware.

SURPLESS, DUNN & CO.,  
55 Warren Street, - - - New York.  
Export Sales Agents.

THESE THREE ARTICLES  
ARE THE BEST OF THEIR KIND.



Tea or Coffee Pot Stand, one  
piece of wire, retinned.



TOWEL RACK.  
HAS NO EQUAL.



Toaster and Broiler,  
made of coiled wire, re-  
tinned.

Manufacturers of Woven Wire  
Hammocks, Steel Hat Racks,  
Wire, Door Mats, etc.

SAMPLE ORDER SOLICITED.

LLOYD MANUFACTURING CO., - - - MINNEAPOLIS, MINN.  
SOWERBY BRIDGE, YORKSHIRE, ENGLAND.

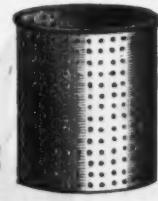
THE 1898 NATIONAL

Sausage Stuffer and Lard Press,

(Patented September 14, 1897.)



SWINGING  
ARCH  
and  
REMOVABLE  
CYLINDER



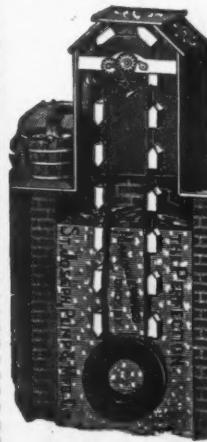
ESPECIALLY  
CONVENIENT  
FOR  
LARD  
PRESSING.

Send  
for  
Circular.



NATIONAL SPECIALTY MFG. CO., Lehigh Ave. and Third St., Philadelphia, Pa.

You know that



the bulk of wa-  
ter for drink-  
ing purposes is  
consumed dur-  
ing the sum-  
mer months.  
Sell your  
trade a

**WATER  
PURIFIER,**

something  
that sets water  
a-sparkling  
with fresh air  
every time the  
wheel goes  
round. First-  
class Hard-  
ware, Pump  
and Imple-  
ment Jobbers all  
know a good  
thing and han-  
dle the

**"Perfection"**  
Bucket Pump

Write for sample outfit to-day.  
Catalog free.

**St. Joseph Pump & Mfg. Co.,**  
ST. JOSEPH, MO., U. S. A.

The Virginia Rotary  
Washing Machine.



Patented Nov. 21, 1898.

Easy Running. Simple. Made of  
Selected Virginia White cedar.  
Welded Wire Hoops. The Dolly  
adjusts itself to the amount of  
clothes in the washer.

**Richmond Cedar Works,**  
Manufacturers of Wooden Ware,  
RICHMOND, VA.

CHAMPION EGG OPENER.



State Iron Age

\* H. H. HARTIGAN, Collinsville, Conn.

REFRIGERATORS.

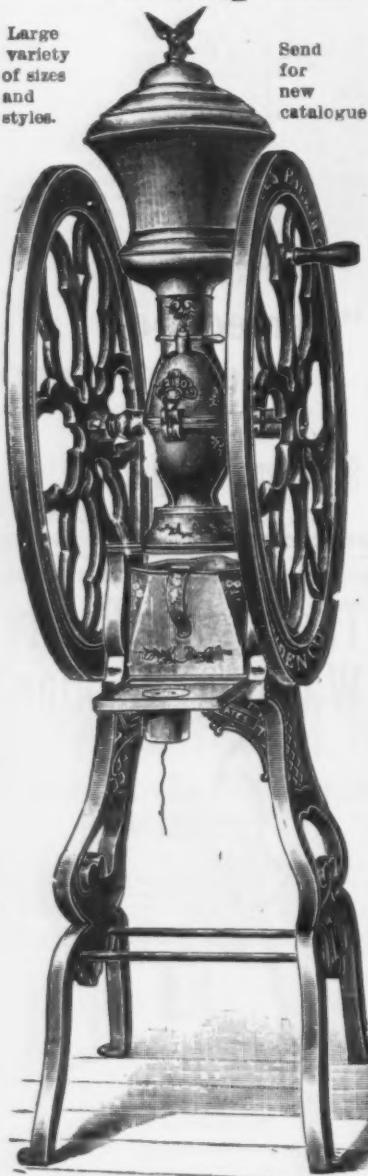


There are more "WHITE MOUN-  
TAINS" sold than any other make.  
Why should there not be when  
they are the best in the market?

Maine Manufacturing Co.,  
NASHUA, N. H.

**Parker's**  
Ball-Bearing, Rapid-Grinding  
Coffee, Spice  
and Drug Mills.

Large  
variety  
of sizes  
and  
styles.



Send  
for  
new  
catalogue.

Also the Famous Parker Gun and a large  
line of Hardware Specialties.

**The Charles Parker Co.,**  
MERIDEN, CONN.,  
and 82 Warren St., New York.

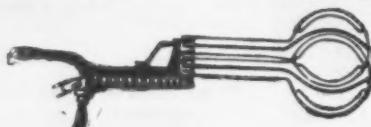
**CLASPS THE CLOTHES ON THE LINE.**  
U. S. Spring Clothes Pin will not damage fabrics.



Send for  
Prices.

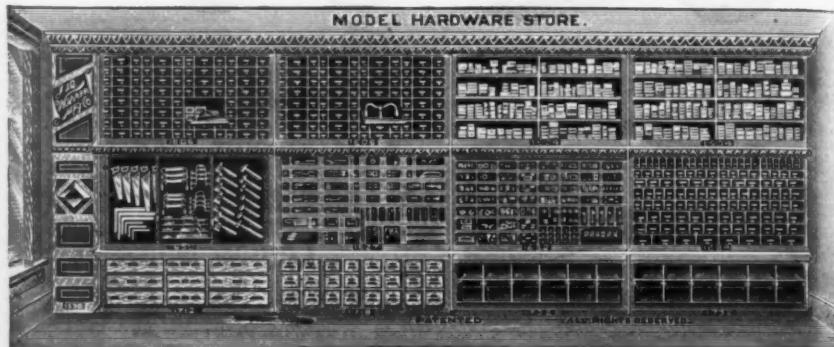
United States  
Clothes Pin Co., MONTPELIER, Vt., U. S. A.

**EGG BEATERS.** We make the largest line in the world. Send  
for samples and prices. **STANDARD CO.** 107 Haverhill St.,  
Boston, U. S. A.



**A MODEL HARDWARE STORE. WE MADE IT SO.**

If you think it any improvement  
on your store, write us to-day.



On receipt of your letter we will quote you prices and  
all information required. Write to-day, we say.

**J. D. Warren Mfg. Co., - Chicago.**

**HEADQUARTERS...**  
For the Largest Variety of  
**HIGH GRADE FAMILY COFFEE MILLS**



Of best quality,  
latest designs,  
and fine finish.  
Also a full  
line of  
**Patented Household Novelties**  
of superior  
quality and  
merit.

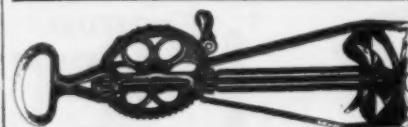
**Light Builders' Hardware, Etc.**

Send for our  
1890 Catalogue.



Something Entirely New. The House-keeper's Delight.

**ARCADE MFG. CO., Freeport, Ill.**



168,052 lbs. of Iron and Steel have been made into  
**Lyon Egg Beaters and Cream Whips.** See  
for New Price-List Circular.

Nelson Lyon, Sole Manuf., 52 Green St., Albany, N. Y.

**WRIGHTSVILLE HARDWARE CO.**

Manufacturers of  
Gate, Blind and Shutter Hinges, Gate Latches,  
Frame Pulleys, Casters, Shelf Brackets, Sash  
Lifts, Drawer Pulis, Hooks, Thumb  
Latches and other goods.

SEND FOR CATALOGUE.

**WRIGHTSVILLE, PA.**

**COLEMAN HARDWARE CO.**

Manufacturers.

**Barn Door Hangers, Furniture  
Casters, Iron Toys, and Fine  
Grey Iron Castings.**

WRITE FOR CATALOGUE.

**CHICAGO, ILLS.**



Is unquestionably the best machine of its kind ever offered to the public. It will cut without crushing raw or cooked meat, sea food, fruit, vegetables, etc., into coarse or fine pieces, according to the cutter used, of which three accompany each chopper.

It has eliminated all the objectionable features of other choppers and has added several improvements that are distinctly its own. It is always in order and the knives require no sharpening.

An additional and exclusive feature of the **Star Food Chopper** is a plate hinged at the top of the hopper which, when pressed on the food to be cut, forces it upon the feed screw, thus preventing the possibility of injuring or soiling the fingers, which is liable to occur in using other choppers.

For sale by all dealers.

**CHAS. D. BROWN, Sole Agent,**  
160 Duane Street, New York City.

**Why is the**



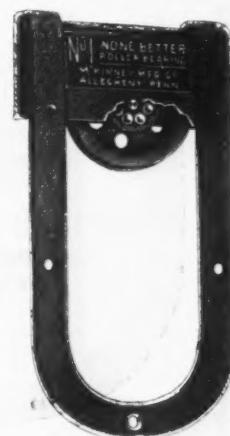
Because it is the only **ROTARY WASHER** that has *Revolving Steel Ball Gearing*, therefore light running and noiseless. No escape of steam; made of red cypress lumber; solid leg staves (not removable, breakable legs); wheel turns either way; dasher reverses automatically, cleaning clothes without rubbing them to pieces. Made to last.

**H. F. BRAMMER MFG. CO.,**  
Davenport, Iowa.

Steel  
Goods

Door Hangers,  
Door Track and Stay Rollers,  
Door Hinges and Butts,  
Felloe Plates and Washers,  
Warehouse Trucks and Specialties.

McKINNEY MFG. CO.,  
ALLEGHENY, PENN.



DO YOU know what a Poised Carrier is? If not, buy and sell the Coburn Rolling Door Hangers and you will get them, and you do not get them with any other make. They will when used in conjunction with the Coburn Round Trough Trolley Track be found to be the "Ne Plus Ultra" in door hangers.

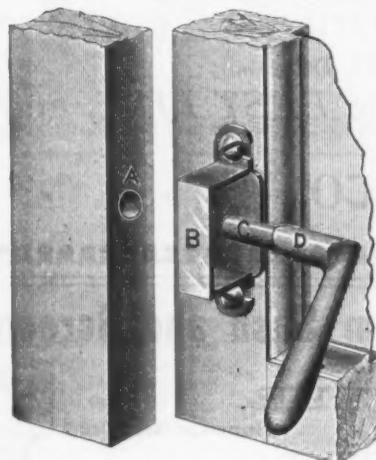
The Coburn Trolley Track Mfg. Co.,

Holyoke, Mass., U. S. A.

### Dolber's Storm Window Fasteners.



Strong,  
Simple,  
Durable.  
Send  
for  
Catalogue.



Best device known for putting up Stationary Outside Windows, Screens, Shutters, and all similar purposes.

THE WALTER W. WOODRUFF & SONS CO., Mount Carmel, Conn., U. S. A.

### THE STERLING KRAUT CUTTER.

DOES  
AWAY  
WITH  
THE  
HARD  
WORK OF  
MAKING  
KRAUT.

N. R. STREETER & CO.,  
ROCHESTER, N. Y.



#### A GUARANTEE OF QUALITY

Our trade-mark is a guarantee of the highest quality that can be obtained in hardware specialties of our line. For fifty years this trade mark has been a synonym of excellence. We manufacture a complete line of Spring Hinges, Door Springs, Door Pulls, Kick or Push Plates, House Numbers, and Barn Door Hangers. Our prices are low in comparison to the high quality of our product. All orders shipped promptly. Our catalogue gives illustrations, prices, and descriptions of our entire line.

CHICAGO SPRING BUTT CO.,  
Chicago.  
New York.



### THE NEW WAYNE ROTARY

No complicated gearing to get out of order or broken. Simply one large pinion fastened on the shell or cover; on small pinion attached to the post; another small pinion meshing in the large one attached to shaft, and the Rack Bar; that's all. Washer operates right or left. The large band wheel is attached to side of tub, does not have to be lifted with the cover; when latter is down it is always ready for business.

THE ANTHONY WAYNE MFG. CO., Ft. Wayne, Ind.



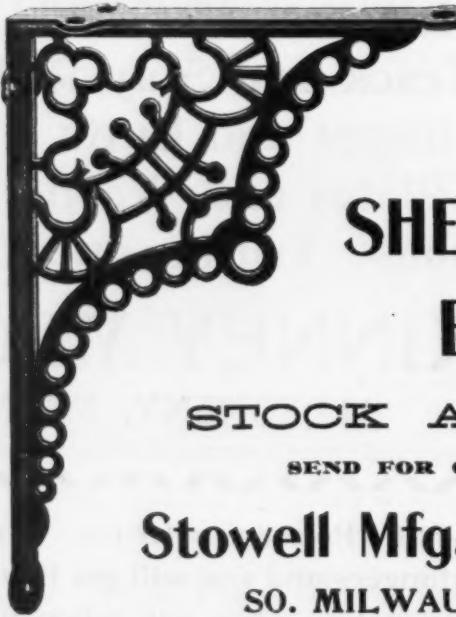
Stowell Mfg. & Fdy. Co.

South Milwaukee,  
Wis.

BRANCHES:—98 Lake St., Chi-  
cago, and London,  
Canada.

CATALOGUES.

- No. 1, GENERAL.
- No. 2, REGISTERS.
- No. 3, RAILROAD HANGERS.
- No. 4, WIRE WORKERS' GOODS.
- No. 5, HANGERS AND RAIL.
- No. 6, MALLEABLE HARDWARE.



**SPECIAL  
.. SALE  
OF  
SHELF ..  
BRACKETS**

STOCK AT COST.

SEND FOR CIRCULARS.

**Stowell Mfg. & Fdy. Co.,  
SO. MILWAUKEE, WIS.**

"TO BE IS BETTER FAR THAN NOT TO BE."

Take some of these fellows who assume to know just as much as we do and can make just as good *DOOR HANGERS* as we can.

With all our charity, we can't see of what earthly use they can or ever will be.

There is only one *BEST LINE*, and we make it.

**WILCOX MFG. CO., - - - AURORA, ILL.**

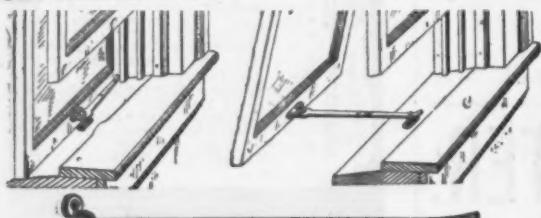
**The "SENSIBLE" Storm Sash and Screen Hangers and Fasteners.**

PATENTED AND MNFD. BY

**R. G. WINTER,**

327 Nicollet Ave.,

Minneapolis, Minn.



For Ventilation.  
Perfectly Tight.  
Easily Put On.  
Easily Taken Off.  
Can Hang Them  
from Inside of the  
House.

PATENT ALLOWED.  
Fastener and Adjuster for Ventilation.  
SEND FOR CIRCULAR AND PRICES.



Hanger No. 1.



Hanger No. 2.



NEVER BREAK

Steel

**"NEVER-BREAK"** Best Finished Goods Made.

Always sweet and clean, FULL WEIGHT. Will not absorb grease. STUBBS GAUGE

Shovels,  
Scoops,  
and Spades.

Spiders, Kettles, Griddles, Stew Pans,  
Scotch Bowls, HIGHLY POLISHED  
AND TINNED.

CATALOGUE UPON APPLICATION.

**THE AVERY STAMPING CO., - - - CLEVELAND, OHIO.**

J. C. McCARTY & CO., 10 Warren Street, New York, Representatives.

# 1000 LBS. WITHOUT CRUSHING.



Cut of Washer, Full Size.

Each ball in the washer in Stanley's Ball Bearing Steel Butts is required to stand the above test. As there are from 8 to 12 balls in each washer, there can be no possible wearing down of butt under any strain that can be put upon it. Being made of wrought steel the butts will not break. They never require oiling.

The Stanley Works, Dept. F,

NEW BRITAIN, CONN.  
79 Chambers St., N. Y.

## The Lawrence Steel Strap Hinge.

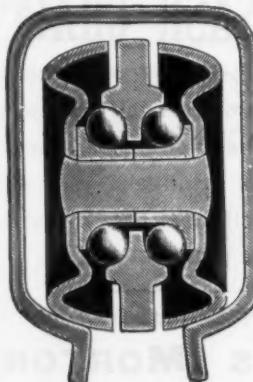


THE LATEST, NEATEST, STRONGEST. The altogether BEST ON THE MARKET. Made from the finest grade of Hinge Steel, cut with the grain, full width at the pintle, gives this hinge three times the strength of the common strap hinge.

WRITE FOR CIRCULARS AND PRICES.

LAWRENCE BROS., STERLING, ILL.

Manufacturers of Steel Door Hangers, Hinges, Pulleys, and other Hardware Specialties.



To secure the best device on the market for hanging sliding doors, order the McCabe Ball-Bearing Door Hanger. Write for catalogue and prices. The McCabe Hanger Mfg. Co., 540 W. 22d Street, New York.

United States Steel Lock Co.,  
CLINTON, IOWA,  
SOLE MAKERS

## WARNER LOCKS.

### LOCKS.

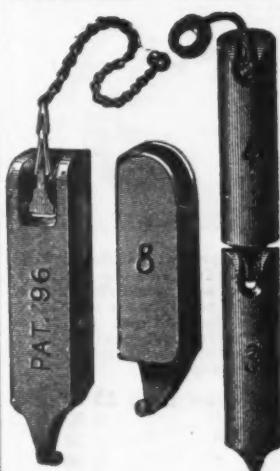
Cold Rolled Steel.  
Accurate in Construction.  
Unsurpassed in Quality.

### HARDWARE.

Artistic in Design.  
Elegant in Finish.  
Moderate in Price.

## The Walda Sectional Window Weight.

Square and Round Weights.  
Hang exactly from centre.  
Only 10 inch pockets required.  
Eliminates use of lead weight.



The Hardware Dealer  
with one-sixth the stock required in one piece weights can fill any order.  
Weight crated with 100 lbs. in a box, both plainly marked.

## The Contractor

saves time, money and delay by balancing windows exactly at once.

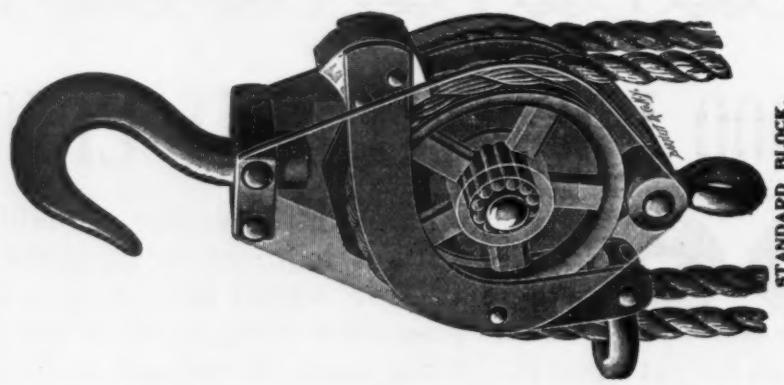
SEND FOR CIRCULAR.

Barney & Reed Mfg. Co.,  
85 Water Street, BOSTON, MASS.

**SASH WEIGHTS.**  
E. E. BROWN & CO.,  
McKean and Meadow Sts.,  
PHILADELPHIA, PA.

# LANE Tackle Blocks.

Automatic Lock.  
Steel Case—galvanized  
Roller Brushed.  
No Check Cord.



STANDARD BLOCK.

**LANE BROTHERS CO.,**  
MANUFACTURERS,  
Prospect and River Sts.,  
POUGHKEEPSIE, N. Y.

## "FOX-ALL-STEEL"

### THE ORIGINAL STEEL PULLEYS

Two Styles,  
Two Sizes.

**LIGHT  
STRONG  
NOISE-  
LESS  
DURABLE**

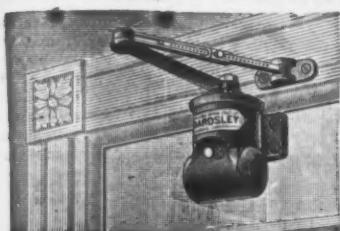


2 1/4 in. Wheel for EITHER a FOUR HOLE or STRAIGHT SIDE MACHINE MORTISE. ADAPTED TO ANY ONE'S USE.

Write for our **SAMPLE PULLEYS FREE.**  
Catalogue and 195 No. Front St.,  
FOX MACHINE CO., Grand Rapids, Mich.

### THE "BARDLEY"

### Oil Door Check and Spring



HAS new and improved features; is free from packing friction; the checking power can be released when the door is near the closing point; more oil can be added when needed without taking it from the door and it can be readily taken apart with the aid of a screw-driver when repairs are necessary.

Size A, price each,	\$3 50
" B, " "	4 00
" C, " "	5 00
" D, " "	6 00
" E, " "	7 00

**LIBERAL DISCOUNTS TO THE TRADE.**

**JOS. BARDLEY,**

147 to 151 Baxter St., NEW YORK CITY.



### Palmer's Common Sense Frame Pulley.



Each pulley its own  
Marking Gauge  
ALL HAVE STEEL AXLES

MANUFACTURED BY  
PALMER HARDWARE MFG. CO.,  
TROY, N. Y.

### Pullman Sash Balance Co.,



MAKERS  
OF THE

### "Pullman" Hardware Specialties

MAIN OFFICE AND WORKS,

Rochester, N. Y., U. S. A.



The cheapest and best galvanized hook on the market. Easiest to put up.

Send for price.  
E. H. WILSON & CO.,  
Boston (Allston), Mass.



### Family Grindstones

should be in every home. A neat and inexpensive necessity. Quick sellers.

**THE CLEVELAND STONE CO.,**

Erie St., Cleveland, Ohio.

Branches: BOSTON, NEW YORK, CHICAGO.

### SILVER LAKE SASH CORD

Has been the standard for thirty years.



Every Hank Bears the Above Label.  
SEND FOR SAMPLE.

## HALT!

### HARDWARE DEALERS

CAN RECOMMEND

### MORTON'S BRONZE AND STEEL CABLE SASH CHAINS

As the best substitute for sash cords ever made. Some in daily use over 25 years. These chains are easily applied to any window. Will run equally as well on either round or square groove pulleys.

MANUFACTURED BY

**THOMAS MORTON,**  
65 Elizabeth Street,  
NEW YORK.

No Screws,  
No Nails.

Use a hammer and a common punch or nail set.



method of fastening the  
**GRAND RAPIDS ALL STEEL SASH PULLEYS.**

Save Freight, Save Time, Save Money. Samples Free.

**GRAND RAPIDS HARDWARE CO.,**  
21 Pearl St., Grand Rapids, Mich.

THE THREE REQUISITES OF A PERFECT GUN,  
BALANCE, EVEN PATTERN AND PENETRATION,  
Can only be obtained after years of experience.



### THE REMINGTON HAMMERLESS

is backed by nearly a century's experience, and the success that rewards the man who shoots a Remington proves that our efforts have not been in vain.

SEND FOR CATALOGUE.

REMINGTON ARMS CO.,  
315 Broadway, N. Y.

Iliion, N. Y.

### Common Sense Re and De Capper

10 AND 12 GAUGE

One Tool for Two Gauges

\$1.50 Each

WILL Re and De Capany of the New High Grade Paper Shells of any make.

WRITE TO

THE BRIDGEPORT GUN IMPLEMENT CO.

313 and 315 BROADWAY, NEW YORK.



We work all kinds of Sheet Metal in all kinds of shapes.

DAVIS & BUXTON,  
STAMPING CO.,

3 Cypress St.,  
Worcester, Mass.

METAL STAMPINGS.

Send Sample or Drawings  
for Price.

### Peters Cartridges and King's Smokeless Powder.

FOR SALE

By All Leading Dealers.

THE PETERS CARTRIDGE CO.,  
CINCINNATI, O.

EASTERN BRANCH, No. 80 Chambers St., New York. HIBBARD, SPENCER,  
BARTLETT & CO., Chicago. F. B. CHAMBERLAIN CO., St. Louis. C. G.  
GRUBB, Agt., Pittsburg. A. L. PETERS, Agt., St. Paul.

### Springfield Drop Forging Co.

SPRINGFIELD, MASS., U.S.A.  
P.O. ADDRESS, BRIGHTWOOD, MASS.

TOOL POSTS.  
TOOL POST RINGS.  
TOOL POST WRENCHES.  
LATHE CHUCK WRENCHES.

BICYCLE  
WRENCHES.

BICYCLE AND  
SPECIAL  
DROP FORGINGS  
OF ALL KINDS.

### SHOP LOCKERS.

WE manufacture  
lockers as a regular  
business, and can  
make an outfit for your  
shop, either from our  
standard designs or  
your specification, at  
less cost than you can  
for yourself.



Send for Catalogue.

NARRAGANSETT MACHINE CO.,  
Providence, R. I., U. S. A.

### MARLIN



#### MARLIN REPEATING SHOT GUNS

For Trap or Field Shooting, combine the elegance of outline, perfection of balance, ease of taking apart and quality of finish of the best double guns with the superiority in sighting and shooting of the single barrel, and also possess the rapidity of fire and magazine capacity of MARLIN REPEATING RIFLES. 120-page catalog of arms and ammunition, colored cover by Osthause, mailed for 3 stamps.

MARLIN FIRE ARMS CO., NEW HAVEN, CT.

IF YOU SHOOT A RIFLE.  
Pistol or Shotgun, you'll make a Bull's Eye by sending three 2-cent stamps for the  
Ideal Hand-Book, 126 pages, FREE.  
The latest Encyclopedia of Arms, Pow-  
ders, Shot and Bullets. Mention Iron  
Age. Address IDEAL MFG. CO., New  
Haven, Conn., U. S. A.

Bicycle,  
Sleigh, House,  
Hand,  
Trip and  
Rotary Door

### BELLS

Send for Catalogue and Price List.

Starr Bros., Bell Co., Easthampton, Conn., U. S. A.

#### H. & R. ARMS COMPANY'S



22 and  
32 Calibers.

Premier  
Automatic.  
Send for  
Catalogue.  
HARRINGTON & RICHARDSON ARMS CO.,  
Worcester, Mass., U. S. A.  
Park Ave. and Chandler St.

PALMER'S PATENTED

# HAMMOCKS \*



Palmer's Patented Arawana  
With Trapeze Suspension  
The above Figure shows an Arawana slung from a Trapeze adjusted to its maximum extension as regards its suspension from the ceiling.

The Trapeze Suspension, as may be seen at a glance, is especially adapted to Veranda use, is adjustable to different sizes of Hammocks within its scope (from 6 ft. 3 in. to 11 ft.), and to giving different degrees of dip and heights of suspension. Every conceivable swinging motion is obtained without effort.



Palmer's Patented Utopia  
With Hammock Support

The above Figure represents a reclining position in an Adjustable Hammock Support as used indoor. This support may be extended or contracted. The seat may be lowered or raised by the adjustment of the side cords where attached to the seat.

This support is adapted to Lawn, Veranda and Indoor use, and, like the Trapeze Suspension, is adjustable to different sizes of Hammocks within its scope (from 6 ft. 3 in. to 11 ft.), and to giving different degrees of dip and height from floor.

For indoor summer or winter use, it will appeal to all who are inclined to ease and comfort, as it can be taken from a closet, set up, and Hammock hung ready for use in one minute.

## PERFECTION—ARAWANA—UTOPIA.

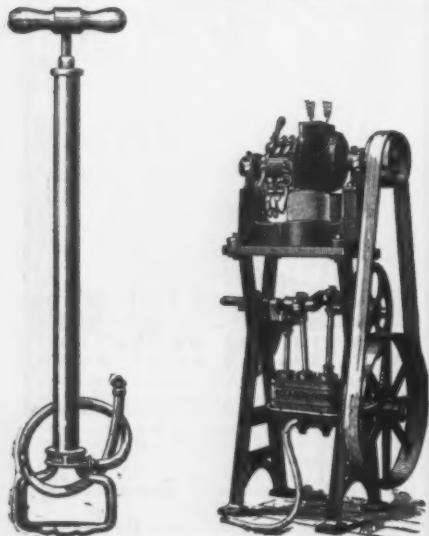
Hammock Supports, Hammock Awnings, Hammock Mosquito Canopies, Trapeze Suspension Bars.

Largest Variety of Patterns, Colors and Accessories. Also Manufacturer of CANOPIES, MOSQUITO NETTINGS, CRINOLINE DRESS LINING, WINDOW SCREEN CLOTH, SCHOOL BAGS, etc., etc. Send for our new catalogue for 1900.

**I. H. PALMER, Middletown, Conn., U. S. A.**

NEW YORK OFFICE, 62 White St.

Infringers are being Prosecuted.



## AIR PUMPS

of every description for Bicycles, Automobiles, etc.  
Hand or Power.

Gas Filters, Proving Pumps, Vacuum Pumps,  
Pumps and Compressors for experimental purposes.

**Gleason-Peters Air Pump Co.,**  
Houston and Mercer Sts., New York.

STEEL FOR PRESSED, STAMPED, DRAWN AND PLATED WORK.

ESTABLISHED 1877. INCORPORATED 1884

**The WILMOT & HOBBS Mfg. Co.**

MANUFACTURERS & EXPORTERS OF

BEST SOFT, EXTRA SOFT & SPRING, BESSEMER  
& OPEN HEARTH, HOT ROLLED, ANNEALED & PICKLED, ALSO  
BRIGHT COLD ROLLED "SWEDOH" STEEL.

UNEXCELLED FOR PRESSED, STAMPED,  
DRAWN & PLATED WORK.

NICKEL PLATED RINGS FOR STOVES  
NICKEL PLATED STEEL  
STOVE EDGE TRIMMINGS  
NICKEL PLATED STEEL TUBES  
FOR STOVE RAILS, TOWEL RODS, ETC.

NOT ROLLING MILLS  
UNMOUNTED GONG  
CRUSHING TEST

WILMOT'S PATENT  
"CLINCHER" CYCLE TUBING  
STRONGER THAN THE SEAMLESS.

WE MAKE A SPECIALTY OF  
WILMOT'S PATENT SPRING STEEL BEDSTEAD TUBING  
OF SUPERIOR FINISH, LIGHTNESS & STRENGTH.

ENGINEERS' & STEAMBOAT SETS. "COPPERIZED" ALSO NICKEL,  
BRASS-PLATED & JAPANNED.

BRANCH OFFICE:  
POSTAL TELEGRAPH BLDG., NEW YORK.

MAIN OFFICES & WORKS:  
BRIDGEPORT, CONN., U.S.A.

COLD ROLLED STRIP STEEL.

Patent "Clincher" Fifty Gauge "Swedoh" Spring Steel Cycle Tubing.

HIGH CLASS  
**DROP FORGINGS.**  
STRIEBY & FOOTE CO.,  
NEWARK, N. J.

MANUFACTURERS OF...

## Bells

of all descriptions;  
also BICYCLE  
SPECIALTIES.

Established in 1838.

AUTOMOBILE BELL.

**Bevin Bros. Mfg. Co.,**  
EAST HAMPTON, CONN.

Millett's Patent



## PORTABLE CORE OVEN

All complete and ready to put the fire in.

No one who makes small cores  
can afford to be without it.

### DOUBLE DOORS.

One closing the oven when the other is open.

## Saves Fuel, Saves Time.

Send for Circular.

**MILLETT CORE OVEN CO., Brightwood, Mass.**

The ovens can be seen in the sample rooms of the S. Obermayer Co., either in Cincinnati or Chicago, and in the show rooms of J. W. Paxson & Co., Philadelphia. England Agents, J. W. Jackman & Co., 90 Victoria St., London S. W.

# Headquarters for Cutlery

American, English, German, French, Swedish.

Pocket Knives,

Table Cutlery,

Razors,

Carvers,

Scissors,

Butchers' Knives,

Shears,

Painters' Knives.

KEY RINGS, CORKSCREWS, TWEEZERS, Etc.

SOLE AGENTS for R. MURPHY'S Oyster Knives, Paper Hangers' Knives, Etc.

NEW ENGLAND AGENTS for EMPIRE KNIFE CO.'S Pocket Knives.

**DAME, STODDARD & COMPANY,**  
BOSTON, MASS.

**The Billings & Spencer Co.,**

Hartford, Conn., U.S.A.



MANUFACTURERS  
...OF Drop Hammers, Presses,  
Forges, Machinists' Tools  
...AND...

**DROP FORGINGS** OF EVERY DESCRIPTION  
in Iron, Steel, Copper, and Bronze,  
for Guns, Pistols, Motor Vehicles,  
Carriages, Sewing Machines, Electrical Motors, Street and Steam Railways, and for any and  
all purposes for which Forgings are required.

**Eye Bolts**  
**Thumb Screws**  
**Thumb Nuts**  
**Machine**  
**Handles**

SEND YOUR SPECIFICATIONS TO THIS COMPANY FOR PROMPT AND INTELLIGENT ATTENTION.

## The Markham Air Rifles



The "PRINCE" is  
our 1900 model. Re-  
tail price \$1.00.

Penetrates  $\frac{1}{4}$  in. pine.

The "KING" single shot, the  
"KING" repeater, the "PRINCE"  
single shot, the "PRINCE" repeater,  
and the "CHICAGO" breech loader, air rifles, absolutely  
the greatest article of amusement known. Shoots B B  
dropshot. For sale by all jobbers.  
Send for catalogue.

THE MARKHAM AIR RIFLE CO., Plymouth, Mich., U. S. A.

**Brown's Patent, Seamless, Oil Chamber Truss  
and Clip Bar Skeins.**

The Best Cast Iron Skein in the World.  
Interchangeable with D. V. & Co.  
and Anderson Truss.



YOUR ORDERS ARE  
SOLICITED.

W. B. MITCHELL, Agent, Manufacturer. Office: 80 Michigan Avenue, Chicago, U. S. A.  
WORKS AT GRAND CROSSING, ILLS.

Forged and Finished  
Wrenches, Snap  
Gauges, Steering  
Knuckles and Axle  
Ends, Commutator  
Bars, etc., etc.



**Sterling  
Bells.**

CONTINUOUS  
RINGING

With  
Rotary  
Movement  
and Non-  
Revolving  
Gongs.  
Best on  
Earth.

Send for Catalogue  
"A."



N. N. HILL BRASS CO.,

EAST HAMPTON,  
CONN.

**WOODMAN'S  
SPEED  
INDICATORS.**



For ascertaining correct speed of Dynamos,  
Steam Engines, Shafting, Floor Machines, etc.  
Supplied with Rubber Tires, Split Caps and  
Plain Caps, etc. Send for catalogue and prices.

R. WOODMAN MFG. & SUPPLY CO.,  
Boston, Mass., U. S. A.

# BURDEN'S HORSE SHOES.

"Burden Best"

Iron

Boiler Rivets.

The Burden Iron Co.

TROY, N. Y.

# PHOENIX HORSE SHOES,

PHOENIX HORSE SHOE CO.

Rolling Mills and Factories,  
Poughkeepsie, N. Y.  
Joliet, Ill.

P. F. BURKE,  
Manufacturer of Patent Steel (Blunt and Sharp)  
  
TOE-CALKS,  
— ALSO —  
BURKE'S IMPROVED  
Horseshoer's Foot Vice  
— Head for circular  
Dovt St., cor. D St.  
SO. BOSTON,  
MASS. 

HORSESHOE - H - CALKS (Neuse's Patent)  
Always Sharp! No Slipping of the Horse!  
No Injuries as caused by other Studs!  
Great Saving of Horses and Horseshoes!  
Price-List, with Testimonials, Post Free.  
Patentees and Sole Manufacturers.

LEONHARDT & CO.,  
Berlin-Schöneberg, Germany.

# DROP FORGINGS.

THE H. SEWARD & SON CO.,

NEW HAVEN, CONN.

Estimates promptly furnished.

The Scranton Forging Co.  
Scranton, Pa.

# DROP FORGINGS TO ORDER.

# CHAMPLAIN FORGED

ALL SIZES.  
ALL PATTERNS.  
ALL WARRANTED.  
SOLD EVERYWHERE.

J. O. McCarty & Co.,  
Agents,  
New York.



Send for Price and  
Illustrated List.

Manufactured by  
NATIONAL  
HORSE NAIL CO.,  
VERGEMEEN,  
VERMONT.

RHODE ISLAND PERKINS HORSE SHOE CO.,  
MANUFACTURERS OF  
HORSE AND MULE SHOES OF THE PERKINS PATTERN.

SPECIALTIES: X L Steel Shoes, Toe and Side Weight Shoes and  
Goodenough Shoes.

Works at VALLEY FALLS, R. I.  
F. W. CARPENTER, Pres.

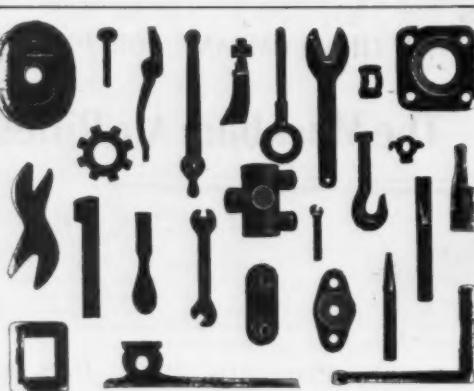
Office, 112 Industrial Trust Building, PROVIDENCE, R. I.  
C. H. PERKINS, Gen. Manager. R. W. COMSTOCK, Sec'y.  
CHARLES R. STARK, Treas.



# CB AND MAUDS K HORSE-NAILS.

The tensile strength of the **K** Iron surpasses that of  
any other material used for Horse-Nails.

PRICES  
To Suit the Times.  
W. M. MOONEY  
& CO.,  
Ausable Chasm, N. Y.



# DROP FORGINGS

## TO ORDER.

Send us Drawings or Samples  
for Estimates on your  
Requirements.

The TRANSUE & WILLIAMS CO.  
ALLIANCE OHIO.

# McKINNON DASH CO.,

MANUFACTURERS OF

Dashes,  
Fenders,  
Roll Up Straps,  
Prop Block  
Washers  
and  
Shaft Leathers.



Largest Capacity  
in the World.

Factories at  
Buffalo, N. Y.,  
Troy, N. Y.,  
Cincinnati, O.,  
Syracuse, N. Y.,  
St. Catharines, Ont.

Store at  
Cincinnati, O.

"W" PATTERN.

# Serrated Edge Corn Hooks.

THE ONLY SERRATED HOOK  
MADE WHICH CAN BE SHARP-  
ENED WITH AN ORDINARY SCYTHE STONE  
WITHOUT LOSING THE SHAPE OF THE  
EDGE AND AT THE SAME TIME HAS A FLAT  
BLADE which will pass through the stalk easily after the edge has done its work.

WITHINGTON & COOLEY MFG. CO.,  
Jackson, Mich., U. S. A.

TEMPERED  
RIBBED  
POLISHED  
SERRATED  
ADJUSTABLE  
CHEAP  
STRONG  
HANGS RIGHT  
IS RIGHT  
SELLS

Turf Nails, Nos. 1 to 5.



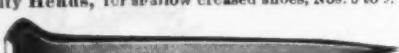
French Heads, will fill any shoe punched or creased.  
Nos. 8 to 8.



Regular Heads, Nos. 5 to 11.



City Heads, for shallow creased shoes, Nos. 5 to 9.



Counter Heads or Frost Nails, Nos. 5 to 9.



## PUTNAM NAILS.

Putnam Hot Forged and Hammer Pointed.  
Neponset Hot Forged and Sharp Pointed.  
Franklin Hot Forged and Sharp Pointed.

The Neponset is produced by the same method and of the same material as the Putnam, with the exception that it is sharp pointed.

The Franklin Nail will be put up under private brands in quantities not less than 80 boxes.

Trade correspondence solicited.

For terms and discounts address

**PUTNAM NAIL CO., Boston, Mass.**

Or { 235 Lake St., Chicago, Ill.  
12-14 Drum St., San Francisco, Cal.

**RICHARD ECCLES, Auburn, N. Y.,**  
MANUFACTURER OF  
**CARRIAGE AND BICYCLE FORGINGS.**



Send for Our Catalogue.

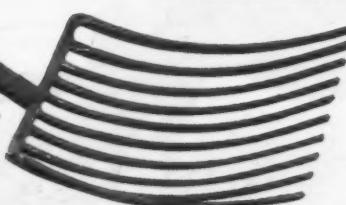
**CONTINENTAL TOOL CO.,**  
**FRANKFORT, N. Y.**  
**FORKS, HOES,**  
**SHOVELS.**

LARGEST CAPACITY.

LOWEST PRICES.

"Not Made by a Trust."

"We Pay the Freight."



**THE ART OF SELLING.**

By F. B. GODDARD.

12mo. Flexible Cloth, 50 Cents.

In this book the author lets the reader into the secrets of the accomplished and successful salesman, illustrates his tact and finesse, and tells how he masters men; but beyond this, the work embraces much information which will be instructive and useful to all classes of business men. Besides suggestions to buyers, it contains chapters on "Changes in Business Conditions and Methods," "Salesmen's Compensation," "Retail Merchants and Salesmen," "Saleswomen," "How to Read Character, with a collection of clearly and tersely put important Legal Principles and Decisions Governing Sales. Sent, post-paid, upon receipt of price, by

DAVID WILLIAMS CO., Publishers and Booksellers, 222 William St., New York.

## Haying Tools



MAKERS OF  
Hay  
Carriers,  
Forks,  
Slings,  
Pulleys,  
&c.



Get our  
No. 17  
Cata-  
logue  
and  
Prices.

**The Ney  
Manufacturing Co.,  
Canton, Ohio.**



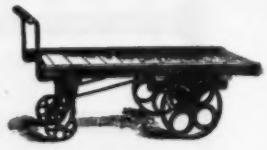
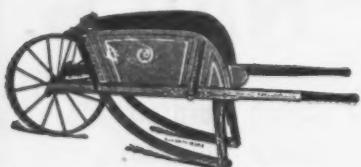
**BLACKSMITHS'  
LEATHER APRONS.**  
Largest Mfrs. in U. S.  
Split Leather, Sheep, Hog, Cow,  
Calf and Horse Hide.  
**THE HULL & HOYT CO.,**  
Danbury, Conn.



**THE KILBOURNE & JACOBS MFG. CO.,**

COLUMBUS, OHIO, U. S. A.

Largest Makers of Wheelbarrows, Scrapers, Steel Shapes, etc., in the world. Send for our Cat. and see all that we make. Yours for the asking



We make these and everything in

**TRUCKS, HAND CARTS, STEEL AND WOOD BARROWS, COAL CARS,  
COAL DEALERS' SUPPLIES, RUBBERED TRUCK  
WHEELS, ROLLERS, &c., &c.**

**LANSING WHEELBARROW CO., Lansing, Mich.**

Chicago Office, 167-169 E. Lake St.

Philadelphia Office, 1937 Market St.



Our make of **Lawn Mowers**, both horse and hand power, have been adopted for **EXCLUSIVE** use season of 1900

on  
**PARIS  
EXPOSITION  
GROUNDS.**



on  
**GREATER  
NEW YORK  
PARKS.**

**COLDWELL LAWN MOWER CO.,**

WE MAKE ONLY HIGH GRADE GOODS.

SEND FOR OUR 1900 CATALOGUE, IT WILL INTEREST YOU.

NEWBURGH,  
B. T.



### WHEELBARROWS

### LARGEST LINE OF TRUCKS



Send for No. 9-A. Cat.  
Syracuse Chilled Plow Co.,  
SYRACUSE,  
N. Y., U. S. A.



### STEEL SCRAPERS HAND CARTS



### BLACK DIAMOND—POLISHED.

BLACK DIAMOND—POLISHED.						
	D.	Handle, Plain Back, Square Point Shovels.	Round	Square	Round	Spades.
G. 22.	D.	64	64	64	64	64
G. 32.	D.	64	64	64	64	64
G. 42.	Long	64	64	64	64	64
G. 52.	Long	64	64	64	64	64
G. 62.	D.	64	64	64	64	64
G. 72.	Long	64	64	64	64	64

Quality and finish unsurpassed by any in the market.

MANUFACTURED BY

St. Louis Shovel Co.,  
ST. LOUIS, MO., U. S. A.



### THE ORATOR and IMPROVED HUNNINGS

Solid back dust transmitters in Wall, Desk and Cabinet Styles.

They are Convenient, Durable and the best of talkers.

A trial will convince anyone of their superiority on either short or long distance work.

Anyone can make an instrument that will work well at first, but to produce one that will continue to meet every proper demand is quite another problem.

The Orator will.

Manufactured by  
THE RAWSON  
ELECTRIC CO.,  
ELYRIA, O., U. S. A.

The Only First Hand Source of  
GENUINE  
MARTY  
TRAPS  
Is with  
BURDITT & WILLIAMS,  
BOSTON, MASS.

## THE "DIG-EZY" FORKS FOR DIGGING POTATOES AND OTHER VEGETABLES.

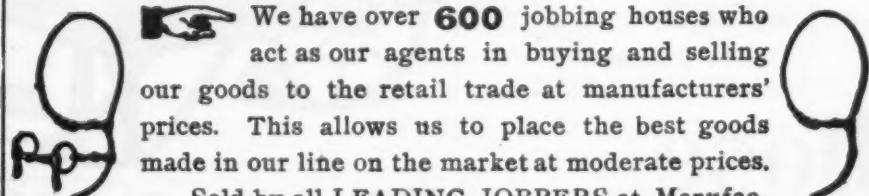


5 AND 6 TINE,  
BLUNT POINTS,  
SCOOP SHAPE,  
AS MADE BY

The Iowa Farming Tool Co.,  
FORT MADISON, IOWA.

## COVERT MFG. CO.,

WEST TROY, N. Y.



We have over 600 jobbing houses who act as our agents in buying and selling our goods to the retail trade at manufacturers' prices. This allows us to place the best goods made in our line on the market at moderate prices.

Sold by all LEADING JOBBERS at Manufacturers' Prices.



COVERT MFG. CO.,

WEST TROY, N. Y.

### Wheelbarrows, Drag and Wheel Scrapers and Trucks

SIDNEY STEEL SCRAPER CO.,  
924 POPLAR STREET  
SIDNEY, O.

Write for Prices and Cat.



### A Tire Setter and Spoke Holder Repair Outfit.

With this complete device, containing all tools necessary, a farmer, livery-man or blacksmith can set a tire, or repair a broken spoke or wheel without removing it in a very few minutes. When once in use it cannot be dispensed with. Descriptive circular on application.

IMPERIAL BIT AND SNAP COMPANY,  
770 Wisconsin Street.  
RACINE, WIS.



THE WEBER HOISTING ENGINES are built to meet the demand from mine owners, quarrymen, ship and dock owners and others, for a strong, substantial and absolutely safe lifting machine that would be more economical, more convenient and more reliable than the steam hoist of the past. They are meeting that demand everywhere. Send for catalog. **Weber Gas and Gasoline Engine Co.**, 485 S. W. Boulevard, Kansas City, Mo. Chicago Office, 1581 Monmouth Block.

ESTABLISHED 1887  
**THE STORM MANUFACTURING CO.**  
The Largest and Leading Makers of  
Dumb-Waiters and Hand Elevators  
NEW YORK OFFICE, FACTORY & MAIN OFFICE.  
113 CHAMBERS ST. NEWARK, N. J.

**W**ILL go further with the C. S. C. than with any other reliable firm in buying useful articles, including Furniture, Beds, Mattresses, Stoves, Sewing Machines, Pianos, Organs, Watches, Bicycles, Safes, Blacksmiths' Tools, Mills, Lathes, Gasoline & Steam Engines, Plows, Scrapers, Carriages, Harness, Saddles, Wire Fencing and SCALES of all varieties. The Premium Wagon or Stock Scale, Steel Frames. Lists free. **Chicago Scale Co.**, CHICAGO, ILL.

# CHAIN

TESTED COIL AND CABLE.

**Jenkins Iron & Tool Co.,**  
HOWARD, PA., U. S. A.

SURPLESS, DUNN & CO., 55 WARREN ST., NEW YORK, N. Y.



**10,000 DEALERS WANTED**

To Sell Our Barn Door Hangers  
Hay Carriers, Hay Slings, etc.  
THERE IS MONEY IN IT.

**THE "LOUDEN GOODS"**

have no equal and are fast taking the place of  
everything else. Don't waste time on some-  
thing out of date, but secure the sale of the goods that command the "cream of the trade." Address  
**LOUDEN MACHINERY CO.**, Box A, Fairfield, Iowa.



HAS NO EQUAL.

**PELOUZE SCALE & MFG CO.**  
CHICAGO CATALOGUE  
**Scales**

MANUFACTURERS OF  
HOUSEHOLD COUNTER  
MARKET CANDY  
POSTAL SCALES  
SPRING BALANCES  
& ETC.



"OUR FAVORITE"  
CIDER MILLS and  
WINE PRESSES

cannot be surpassed. There are  
none better and but few as good.  
Write for special prices to jobbers.  
**R. W. WHITEHURST & CO.**,  
Manufacturers,  
Norfolk, Va., U. S. A.

**VAN DORN'S Steel  
Joist  
Hanger**

HAS NO EQUAL  
Send for Catalogue.

**THE VAN DORN  
IRON WORKS CO.,**  
CLEVELAND,  
OHIO.

STRUCTURAL STEEL.  
AND ORNAMENTAL IRON WORKERS.

**Hose  
Washers**

For the  
Spring Trade.

Write at once for Prices.

**H. O. CANFIELD,**  
434 Myrtle Ave.,  
BRIDGEPORT, CONN.

Manufacturers of Molded Boiler  
Gaskets, Pipe Unions, Bumper Tips,  
and all classes of Molded Rubber  
Work for Mechanical Purposes.  
Estimates for molds and all kinds  
of work on application.

Correspondence Solicited.

**LIGHT CARS**

OF ALL KINDS  
FOR MINING, LOGGING, PLANTATION,  
CONTRACTORS & RAILWAY USE.  
**SHEFFIELD CAR CO.**  
OAK ST., THREE RIVERS, MICH.



**Solid Steel Tray  
WHEELBARROWS**

OF  
ALL  
KINDS.

Manufactured by  
**The American Steel Scraper Co.,**  
SIDNEY, OHIO, U. S. A.

Write for prices



**The ILLINOIS SCREW CO.,**  
20 SOUTH CANAL ST., CHICAGO.

**C. L. PLEUGER,**  
Pres't and Gen'l Mgr.

**H. W. HENGER,**  
Sec'y and Treas.

**H. H. SANDERS,**  
Superintendent.

**Pleuger & Henger Mfg. Co.,**  
ST. LOUIS, MO.

Lawn Sprinklers,  
Hose Nozzles,  
Spray Nozzles,  
Hose Couplings,  
Gate Hinges,  
Blind Hinges,  
Tire Drills,  
Dog Irons,  
Etc., Etc.  
Grindstone Fixtures,  
Family Grindstones,  
Well Wheels,  
Hay Fork Pulleys,  
Axle Pulleys,  
Shoe Lasts and Stands.

Gray Iron  
and Brass

**HARDWARE  
SPECIALTIES**

Plumbers' and  
Water Works  
Specialties.

Send for our latest cata-  
logue and price-list.

Brass Cocks,  
Petroleum Cocks,  
Signal Gongs,  
Barn Door Hangers,  
Sliding Door Hangers,  
Latches,  
Pump Fixtures,  
Common Sad Irons,  
Cold Handle Sad Irons,  
Shelf Brackets,  
Hand Rail Brackets,  
Plated Brackets,  
Door Hinges,  
Mauls,  
Tuyeres.

## ALPHABETICAL LIST OF ADVERTISERS

**A**

Acme Machinery Co. .... 59  
 Acme Shear Co. .... 59  
 Acme Steel & Malleable Iron Works. .... 32  
 Adam, W. J. .... 8  
 Adams Co. .... 64  
 Adriance Machine Works. .... 71  
 Aaffleck, Geo. E. .... 91 & 13  
 Aiken, Henry. .... 39  
 Ajax Mfg. Co. .... 58  
 Alabama Consolidated Coal & Iron Co. .... 25  
 Albany Foundry Co. .... 36  
 Alexander Bros. .... 48  
 Allentown Rolling Mills. .... 34  
 Allis, E. F. Co. .... 48  
 American Appraisal Co. .... 89  
 American Blower Co. .... 66  
 American Bridge Co. .... 15  
 American Carburizing Co. .... 33  
 American Gas Furnace Co. .... 38  
 American Emery Wheel Wks. .... 55  
 American Hardware Mfg. Co. .... 91  
 American Iron & Steel Mfg. Co. .... 24  
 American Mfg. Co. .... 68 & 92  
 American Metal Co. .... 3  
 American Nickeloid Co. .... 4  
 American Pig Iron Storage Warrant Co. .... 31  
 American Pulley Co. .... 50  
 American Railway Supply Co. .... 89  
 American Screw Co. .... 106  
 American Shearer Mfg. Co. .... 98  
 American Sheet Steel Co. .... 1 & 22  
 American Steel Hoop Co. .... 21  
 American Steel Scraper Co. .... 91 & 130

America Steel & Wire Co. .... 10  
 American Tin Plate Co. .... 22  
 American Tool Chest Co. .... 93  
 American Tool Works Co. .... 72  
 Ames sword Co. .... 45  
 Ansoulin Brass & Copper Co. .... 2  
 Arcade File Works. .... 112  
 Arcade Malleable Iron Co. .... 33  
 Arcade Mfg. Co. .... 118  
 Armstrong Bros. Tool Co. .... 62  
 Armstrong Mfg. Co. .... 69  
 Armstrong, R. S. & Bro. .... 87  
 Asher, A. .... 82  
 Ashland Steel Co. .... 24  
 Ashton Valve Co. .... 49  
 Asphalt Ready Rfg. Co. .... 9  
 Athol Machine Co. .... 111  
 Athol Pump Co. .... 103  
 Atkins, E. C. & Co. .... 96  
 Atlas Bolt & Screw Co. .... 42  
 Atlas Mfg. Co. .... 102 & 133  
 Atlas Pipe Wrench Co. .... 119  
 Aultman Co. .... 48  
 Automatic Machine Co. .... 67  
 Avery Stamping Co. .... 91 & 120

**C**

Babcock & Wilcox Co. .... 45  
 Baeder, Adamson & Co. .... 94  
 Baird, C. K. & Co. .... 25  
 Baird, U. Machinery Co. .... 84  
 Baker, Jas. H. Mfg. Co. .... 35  
 Ball Bearing Co. .... 52  
 Bardsley, Jos. .... 121  
 Barker & Chard Mch. Tool Co. .... 69  
 Barnes, Wallace Co. .... 5  
 Barnes, W. F. & John Co. .... 72  
 Barnes Mfg. Co. .... 115  
 Barnett, G. & H. Co. .... 113  
 Barnes, Reed Mfg. Co. .... 12  
 Barnum, E. T. .... 6  
 Barrett, W. L. .... 102  
 Baush Mch. Tool Co. .... 77  
 Bayley, Wm. & sons Co. .... 41  
 Beaury & Co. .... 65  
 Becker & Brainard Milling Mch. Co. .... 18  
 Bement Machine Co. .... 36  
 Bement, Edwin & sons Co. .... 14  
 Bement, Miles & Co. .... 10  
 Bents & Call Hardware & Tool Co. .... 108  
 Bentz Bros. Co. .... 36  
 Bessell, C. H. & Co. .... 110  
 Best, L. .... 56  
 Bessemer Coke Co. .... 57  
 Bethlehem Fdry. & Mch. Co. .... 67  
 Bethlehem Steel Co. .... 31  
 Bevin Bros. Mfg. Co. .... 124  
 Bickford Drill & Tool Co. .... 68  
 Bicknell Hardware Co. .... 104  
 Bicycle Step Ladder Co. .... 114  
 Bigelow, J. F. .... 61  
 Bignal & Keefer Mfg. Co. .... 61  
 Billings & Spencer Co. .... 125  
 Birdsboro Iron & Steel Break ing Co. .... 87  
 Bishop, Geo. H. & Co. .... 102  
 Bissell, E. & Co. .... 88  
 Blackwell & King. .... 5  
 Blackwell, G. G. Sons & Co. .... 21  
 Blair, Reed F. & Co. .... 22  
 Blanke, M. J. & M. .... 15  
 Blanke & Johnson. .... 15  
 Bliss Co., E. W. .... 75  
 Bliss, R. Mfg. Co. .... 100  
 Boker, Hermann & Co. .... 27  
 Bole, Rees & Co. .... 31

Bommer Bros. .... 147  
 Booth, The Lloyd Co. .... 81  
 Borgner, Cyrus. .... 34  
 Boston Belting Co. .... 50  
 Boston Blower Co. .... 66  
 Boston Bridge Works. .... 19  
 Boston Gear Works. .... 54  
 Boston & Lockport Block Co. .... 41  
 Botjer, C. .... 97  
 Bowler, Geo. H. .... 84  
 Box, Alfred & Co. .... 53  
 Braddock Mach. & Mfg. Co. .... 14  
 Bradlee & Co. .... 25  
 Bradley Co. .... 70  
 Braeburn Steel Co. .... 30  
 Brummer, H. F. Mfg. Co. .... 118  
 Braunsdorf-Mueller Co. .... 96  
 Bridgeport Brass Co. .... 2  
 Bridgeport Chain Co. .... 115  
 Bridgeport Deoxidized Bronze & Metal Co. .... 2  
 Bridgeport Gun Implement Co. .... 123  
 Bridgeport Mfg. Co. .... 99  
 Bridgeport Safety Emery Wheel Co. .... 56  
 Briggs, Marvin. .... 80  
 Bristol Co. .... 1  
 Broderick & Bascom Rope Co. .... 7  
 Brooks, M. S. & Sons. .... 8  
 Brown, Chas. .... 118  
 Brown & Co., Inc. .... 93  
 Brown, E. E. & Co. .... 121  
 Brown Hoisting & Conveying Mch. Co. .... 51  
 Brown, R. H. & Co. .... 94  
 Brown & Sharpe Mfg. Co. .... 79  
 Buck Bros. .... 99  
 Buck, Chas. .... 99  
 Buffalo Emery Wheel Co. .... 54  
 Buffalo Forge Co. .... 91 & 140  
 Buhl Malleable Co. .... 42  
 Bullard Mch. Tool Co. .... 63  
 Burden Iron Co. .... 126  
 Burditt & Williams. .... 12  
 Burke, P. F. .... 125  
 Arcade Malleable Iron Co. .... 65  
 Arcade Mfg. Co. .... 118  
 Armstrong Bros. Tool Co. .... 62  
 Armstrong Mfg. Co. .... 69  
 Armstrong, R. S. & Bro. .... 87  
 Asher, A. .... 82  
 Ashland Steel Co. .... 24  
 Ashton Valve Co. .... 49  
 Asphalt Ready Rfg. Co. .... 9  
 Athol Machine Co. .... 111  
 Athol Pump Co. .... 103  
 Atkins, E. C. & Co. .... 96  
 Atlas Bolt & Screw Co. .... 42  
 Atlas Mfg. Co. .... 102 & 133  
 Atlas Pipe Wrench Co. .... 119  
 Aultman Co. .... 48  
 Automatic Machine Co. .... 67  
 Avery Stamping Co. .... 91 & 120

**D**

Dallett, Thos. H. & Co. .... 70  
 Dame, Stoddard & Co. .... 125  
 Danielson Mch. & Tool Co. .... 82  
 D'Amour & Littledale Mch. Co. .... 63  
 Darby, Edw. & Sons. .... 12  
 Bullard Mch. Tool Co. .... 63  
 Burden Iron Co. .... 126  
 Burditt & Williams. .... 12  
 Burke, P. F. .... 125  
 Burnham, Geo. Co. .... 65  
 Burns Hydro Carbon Burner Co. .... 41  
 Butterfield & Co. .... 61  
 Byram & Co. .... 31

**E**

Cabeen & Co. .... 30  
 Cahall Sales Dept. .... 1392  
 Caldwell Mfg. Co. .... 94  
 California Wire Works. .... 51  
 Canfield, H. O. .... 130  
 Capewell Horse Nail Co. .... 1  
 Carbonundum Co. .... 55  
 Card, S. W. Mfg. Co. .... 57  
 Carlin's Sons, Thomas Co. .... 65 & 81  
 Carter & Hakes Machine Co. .... 73  
 Cary Mfg. Co. .... 93  
 Cary Spring Works. .... 5  
 Cattaraugus Cutlery Co. .... 99  
 Central Hardware Co. .... 103  
 Chambers Bros. Co. .... 17  
 Champion Blower & Forge Co. .... 64  
 Champion Iron & Steel Co. .... 9  
 Chandler & Farquhar. .... 107  
 Chapman, J. B. & Co. .... 53  
 Chapman Valve Mfg. Co. .... 43  
 Charter Gas Engine Co. .... 42  
 Chatillon, John & sons. .... 4  
 Cheney, S. & son. .... 34  
 Barnett, G. & H. Co. .... 113  
 Barnes, Reed Mfg. Co. .... 12  
 Barnum, E. T. .... 6  
 Barrett, W. L. .... 102  
 Baush Mch. Tool Co. .... 77  
 Bayley, Wm. & sons Co. .... 41  
 Beaury & Co. .... 65  
 Becker & Brainard Milling Mch. Co. .... 18  
 Bement Machine Co. .... 36  
 Bement, Edwin & sons Co. .... 14  
 Bement, Miles & Co. .... 10  
 Bents & Call Hardware & Tool Co. .... 108  
 Bentz Bros. Co. .... 36  
 Bessell, C. H. & Co. .... 110  
 Best, L. .... 56  
 Bessemer Coke Co. .... 57  
 Bethlehem Fdry. & Mch. Co. .... 67  
 Bethlehem Steel Co. .... 31  
 Bevin Bros. Mfg. Co. .... 124  
 Bickford Drill & Tool Co. .... 68  
 Bicknell Hardware Co. .... 104  
 Bicycle Step Ladder Co. .... 114  
 Bigelow, J. F. .... 61  
 Bignal & Keefer Mfg. Co. .... 61  
 Billings & Spencer Co. .... 125  
 Birdsboro Iron & Steel Break ing Co. .... 87  
 Bishop, Geo. H. & Co. .... 102  
 Bissell, E. & Co. .... 88  
 Blackwell & King. .... 5  
 Blackwell, G. G. Sons & Co. .... 21  
 Blair, Reed F. & Co. .... 22  
 Blanke, M. J. & M. .... 15  
 Blanke & Johnson. .... 15  
 Bliss Co., E. W. .... 75  
 Bliss, R. Mfg. Co. .... 100  
 Boker, Hermann & Co. .... 27  
 Bole, Rees & Co. .... 31

**E**

Chicago Flexible Shaft Co. .... 59  
 Chicago House Wrecking Co. .... 83  
 Chicago, Milwaukee & St. Paul Ry. .... 89  
 Chicago Pneumatic Tool Co. .... 76  
 Chicago Scale Co. .... 130  
 Chicago Screw Co. .... 12  
 Chicago Spring Butt Co. .... 119  
 Chicago Time Register Co. .... 10  
 Hillcoat-Evans Chain Co. .... 101  
 Chisholm & Moore Mfg. Co. .... 140  
 Chrome Steel Works. .... 30  
 Church, Isaac. .... 14  
 Church, S. K. .... 25  
 Cincinnati Mach. Tool Co. .... 70  
 Cincinnati Milling Mch. Co. .... 69  
 Cincinnati Planer Co. .... 63  
 Clapp, E. D. Mfg. Co. .... 135  
 Clark, John W. .... 5  
 Clark & Cowles. .... 5  
 Clark & Parsons Co. .... 139  
 Clark, Queen & Morse. .... 114  
 Clark, W. J. Co. .... 95  
 Clayton Air Compressor Wks. .... 46  
 Cleveland Ball & Screw Co. .... 66  
 Cleveland City Forge & Iron Co. .... 1  
 Cleveland Crane & Car Co. .... 52  
 Cleveland Elevator Bucket Co. .... 48  
 Cleveland Stamping & Tool Co. .... 91  
 Cleveland Stone Co. .... 121  
 Cleveland Twist Drill Co. .... 58  
 Clinton Wire Cloth Co. .... 12  
 Cobb & Drew. .... 16

**F**

Coburn Trolley Track Mfg. Co. .... 119  
 Cooling Mfg. Co. .... 33  
 Coes Wrench Co. .... 109  
 Coldwell Lawn Mower Co. .... 124  
 Coleman Hardware Co. .... 118  
 Conn. Valley Mfg. Co. .... 95  
 Consolidated Iron & Steel Co. .... 23  
 Consolidated Rail'y Electric Co. .... 127  
 Continental Tool Co. .... 127  
 Cook, A. D. .... 45  
 Cook, Asa S. & Co. .... 76  
 Cook, H. C. & Co. .... 98  
 Cornell, J. B. & J. M. .... 75  
 Cotton, Barclay W. & Co. .... 31  
 Covert Mfg. Co. .... 121  
 Covert's Saddlery Works. .... 91  
 Cox, Justice, Jr. & Co., Ltd. .... 28  
 Cramp, Wm. & Sons & E. B. Co. .... 3  
 Crane, W. M. Co. .... 32  
 Crescent Brass & Iron Co. .... 95  
 Crescent Mfg. Co. .... 13  
 Crescent Phosphorized Metal Co. .... 3  
 Crescent Steel Co. .... 21  
 Cresson, Geo. V. Co. .... 47  
 Cronk Hanger Co. .... 110  
 Crosby Steam Gage & Valve Co. .... 40  
 Cross & Spels Machine Co. .... 65  
 Cunliffe, R. M. .... 97  
 Curtis & Curtis. .... 51  
 Cushman Chuck Co. .... 62

**G**

Dallett, Thos. H. & Co. .... 70  
 Dame, Stoddard & Co. .... 125  
 Danielson Mch. & Tool Co. .... 82  
 D'Amour & Littledale Mch. Co. .... 63  
 Darby, Edw. & Sons. .... 12  
 Bullard Mch. Tool Co. .... 63  
 Burden Iron Co. .... 126  
 Burditt & Williams. .... 12  
 Burke, P. F. .... 125  
 Burnham, Geo. Co. .... 65  
 Burns Hydro Carbon Burner Co. .... 41  
 Butterfield & Co. .... 61  
 Byram & Co. .... 31

Dickinson, T. L. .... 53  
 Dienteit & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Doebler Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Drouve, G. Co. .... 103  
 Du Bois Iron Works. .... 31  
 Dodge Mch. & Tool Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co. .... 61  
 Donaldson & Newton. .... 87  
 Draper Machine Tool Co. .... 76  
 Duval, John & Sons. .... 2  
 Dawson, A. L. & Co. .... 84  
 Defiance Mch. Wks. .... 62  
 DeKalb Fence Co. .... 11  
 Denning Co. .... 105  
 Denman & Davis. .... 27  
 Detrich & Harvey Machine Co. .... 63  
 Diamond Drill & Mch. Co. .... 32  
 Diamond Machine Co. .... 55  
 Diamond Tack & Nail Wks. .... 19  
 Dickinson, T. L. .... 53  
 Dienelt & Elsenhardt. .... 61  
 Dillon-Griswold Wire Co. .... 11  
 Dimmick, J. K. & Co. .... 31  
 Distant, Henry & Son. .... 97  
 Divine Bros. Co. .... 51  
 Dixon, Jos. Crucible Co. .... 48  
 Doan, J. B. & Co. .... 22  
 Dodge Machine Screw Co. .... 73  
 Dodge Mfg. Co. .... 49  
 Doelker Mfg. Co

Laughlin, Alex & Co. .... 39  
 Law, Ernest & Co. .... 28  
 Lawrence Bros. .... 121  
 Lea, J. Tatnall & Co. .... 28  
 LeCount, Wm. G. .... 112  
 Leffler, Chas. & Co. .... 68  
 Leng's, Jno. S., Son & Co. .... 140  
 Leonard, John & Co. .... 87  
 Leonhardt & Co. .... 125  
 Leschen, A. & Sons Rope Co. .... 7  
 Lewis, Henry & Co. .... 31  
 Lewis Tool Co. .... 118  
 Lidgerwood Mfg. Co. .... 140  
 Lilienberg, N. .... 29  
 Lime Steel Castings Co. .... 30  
 Lindsay, W. W. & Co. .... 24  
 Link-Belt Engineering Co. .... 51  
 Livermore, Homer F. .... 38 & 39  
 Lloyd Mfg. Co. .... 117  
 Lockhart Iron & Steel Co. .... 27  
 Lodge & Shipley Mch. Tool Co. .... 80  
 Logan Iron & Steel Co. .... 87  
 Logan & Strobridge Iron Co. .... 98  
 Lorain Foundry Co. .... 31  
 Lorain Steel Co. .... 29  
 Loudon Mch. Co. .... 181  
 Loyd, John Co. .... 101  
 Ludlow-Saylor Wire Co. .... 9  
 Lufkin Rule Co. .... 108  
 Lukens Iron & Steel Co. .... 26  
 Lund, S. T. .... 81  
 Lyon, N. .... 118

**M**

McCabe, J. J. .... 69 & 80  
 McCabe Hanger Mfg. Co. .... 19 & 121  
 McCaffrey File Co. .... 112  
 McClure, G. W., Son & Co. .... 39  
 McCoy, Joe F. Co. .... 52  
 McCullough Iron Co. .... 23  
 McDowell, Stocker & Co. .... 83  
 McFarland, Wm. .... 5  
 McGowan, J. H. & Co. .... 46  
 McInnes, C. E. .... 26  
 McKay, Jas. & Co. .... 28  
 McKinney Mfg. Co. .... 119  
 McKinnon Dash Co. .... 126  
 McNab & Harlin Mfg. Co. .... 42  
 Macomber & Whrte Rrpe Co. .... 7  
 Magnolia Metal Co. .... 1  
 Main Belting Co. .... 48  
 Maine Mfg. Co. .... 117  
 Manning, Maxwell & Moore. .... 82  
 Manville Machine Co., E. J. .... 79  
 Markham Air Rifle Co. .... 125  
 Markle Lead Works. .... 91  
 Marlin Fire Arms Co. .... 123  
 Marshall & Huschart Machy. Co. .... 83  
 Mason & Parker. .... 95  
 Mason Regulator Co. .... 43  
 Matthiessen & Hegeler Zinc Co. .... 2  
 Maurer, H. & Son. .... 34  
 May & Spaulding. .... 87  
 Mayhew, H. H. Co. .... 103  
 Maywood F'dry & Mch. Co. .... 38  
 Merchant & Co. .... 61  
 Merrill Mfg. Co. .... 61  
 Merrill Bros. .... 1  
 Mersick C. S. & Co. .... 70  
 Mesta Machine Co. .... 31  
 Michigan College of Mines. .... 82  
 Michigan Wire Cloth Co. .... 13  
 Metz, Aug. .... 42  
 Milbradt, G. A. & Co. .... 104  
 Miles, F. S. .... 17  
 Miles, E. O. & Co. .... 87  
 Millar, C. & Son Co. .... 130  
 Miller, H. J. .... 16  
 Miller & Van Winkle. .... 140  
 Millers Falls Co. .... 94 & 140  
 Millett Core Oven Co. .... 124  
 Milne, A. & Co. .... 28  
 Milton Mfg. Co. .... 17  
 Milwaukee Tack Co. .... 16  
 Miner & Peck Mfg. Co. .... 65  
 Mitchell, W. B. .... 123  
 Mohr, J. J. .... 28  
 Monce, S. G. .... 100  
 Montgomery, R. R. & Co. .... 114  
 Mooney, W. M. & Co. .... 125  
 Moore, C. P. .... 104  
 Moore, Franklin Co. .... 16  
 Morgan Construction Co. .... 11  
 Morgan Spring Co. .... 5  
 Morley Bros. .... 104  
 Morris, P. Hollingsworth. .... 35  
 Morrison, Robert. .... 42  
 More Twist Drill & Mch. Co. .... 39  
 Morse, Williams & Co. .... 51  
 Morton, Thos. .... 121  
 Morton Mfg. Co. .... 25  
 Moseley Iron Bridge & Tool Co. .... 19  
 Mossberg, Frank Co. .... 91  
 Mossberg & Granville Manufacturing Co. .... 77  
 Mt. Vernon Pattern & Model Wks. .... 80  
 Mugford, A. .... 62  
 Murdock Parlor Grate Co. .... 62  
 Myers, F. E. & Bro. .... 105

**N**  
 Nanz, C. & Co. .... 9  
 Narragansett Mch. Co. .... 121  
 Nash, Geo. & Co. .... 23  
 National Cutlery Co. .... 98  
 National Elastic Nut Co. .... 14  
 National Horse Nail Co. .... 126  
 National Machinery Co. .... 59  
 National Pancoast Ventilator Co. .... 95  
 National Pipe Bending Co. .... 41  
 National Saw Co. .... 96  
 National Sewing Machine Co. .... 116  
 National Specialty Mfg. Co. .... 117  
 National Steel Co. .... 26  
 National Tube Co. .... 20  
 National Wire Corp. .... 13  
 Naugatuck Mfg. Co. .... 45  
 Nazel, John. .... 76  
 New Geo. M., Jr. .... 113  
 New Albany Mfg. Co. .... 35  
 New Brunswick Fdry. Co. .... 34  
 New Century Mfg. Co. .... 96  
 New Doty Mfg. Co. .... 71  
 New England Steel Casting Co. .... 30  
 New England Structural Co. .... 19  
 new Freedom Wire Cloth Co. .... 13  
 Newhall, Henry B. .... 19  
 New Haven Mfg. Co. .... 67  
 New Haven Wire Mfg. Co. .... 5  
 N. J. Iron & Metal Co. .... 87  
 N. J. Wire Cloth Co. .... 12  
 Newkirk, J. B. & Co. .... 28  
 Newport News Shipbuilding & Dry Dock Co. .... 43  
 New Process Twist Drill Co. .... 59  
 N. Y. Air Compressor Co. .... 46  
 N. Y. Blower Co. .... 66  
 N. Y. Machinery Depot. .... 90  
 N. Y. Stamping Co. .... 102  
 McDowell, Stocker & Co. .... 83  
 McFarland, Wm. .... 5  
 McGowan, J. H. & Co. .... 46  
 McInnes, C. E. .... 26  
 McKay, Jas. & Co. .... 28  
 McKinney Mfg. Co. .... 119  
 McKinnon Dash Co. .... 126  
 McNab & Harlin Mfg. Co. .... 42  
 Macomber & Whrte Rrpe Co. .... 7  
 Magnolia Metal Co. .... 1  
 Main Belting Co. .... 48  
 Maine Mfg. Co. .... 117  
 Manning, Maxwell & Moore. .... 82  
 Manville Machine Co., E. J. .... 79  
 Markham Air Rifle Co. .... 125  
 Markle Lead Works. .... 91  
 Marlin Fire Arms Co. .... 123  
 Marshall & Huschart Machy. Co. .... 83  
 Mason & Parker. .... 95  
 Mason Regulator Co. .... 43  
 Matthiessen & Hegeler Zinc Co. .... 2  
 Maurer, H. & Son. .... 34  
 May & Spaulding. .... 87  
 Mayhew, H. H. Co. .... 103  
 Maywood F'dry & Mch. Co. .... 38  
 Merchant & Co. .... 61  
 Merrill Mfg. Co. .... 61  
 Merrill Bros. .... 1  
 Mersick C. S. & Co. .... 70  
 Mesta Machine Co. .... 31  
 Michigan College of Mines. .... 82  
 Michigan Wire Cloth Co. .... 13  
 Metz, Aug. .... 42  
 Milbradt, G. A. & Co. .... 104  
 Miles, F. S. .... 17  
 Miles, E. O. & Co. .... 87  
 Millar, C. & Son Co. .... 130  
 Miller, H. J. .... 16  
 Miller & Van Winkle. .... 140  
 Millers Falls Co. .... 94 & 140  
 Millett Core Oven Co. .... 124  
 Milne, A. & Co. .... 28  
 Milton Mfg. Co. .... 17  
 Milwaukee Tack Co. .... 16  
 Miner & Peck Mfg. Co. .... 65  
 Mitchell, W. B. .... 123  
 Mohr, J. J. .... 28  
 Monce, S. G. .... 100  
 Montgomery, R. R. & Co. .... 114  
 Mooney, W. M. & Co. .... 125  
 Moore, C. P. .... 104  
 Moore, Franklin Co. .... 16  
 Morgan Construction Co. .... 11  
 Morgan Spring Co. .... 5  
 Morley Bros. .... 104  
 Morris, P. Hollingsworth. .... 35  
 Morrison, Robert. .... 42  
 More Twist Drill & Mch. Co. .... 39  
 Morse, Williams & Co. .... 51  
 Morton, Thos. .... 121  
 Morton Mfg. Co. .... 25  
 Moseley Iron Bridge & Tool Co. .... 19  
 Mossberg, Frank Co. .... 91  
 Mossberg & Granville Manufacturing Co. .... 77  
 Mt. Vernon Pattern & Model Wks. .... 80  
 Mugford, A. .... 62  
 Murdock Parlor Grate Co. .... 62  
 Myers, F. E. & Bro. .... 105

**P**  
 Palmer, I. E. .... 124  
 Palmer Hardware Mfg. Co. .... 122  
 Paradox Machinery Co. .... 93  
 Pardee, C. Works. .... 25  
 Parker, Chas. Co. .... 118  
 Passaic Rolling Mill Co. .... 26  
 Patch, F. R. Mfg. Co. .... 68  
 Patterson, F. L. .... 81  
 Pawling & Harnischfeger. .... 52  
 Paxson, J. W. Co. .... 49  
 Peck, Stow & Wilcox Co. .... 114  
 Pedrick & Ayer Co. .... 40  
 Monce, S. G. .... 100  
 Montgomery, R. R. & Co. .... 114  
 Mooney, W. M. & Co. .... 125  
 Moore, C. P. .... 104  
 Moore, Franklin Co. .... 16  
 Morgan Construction Co. .... 11  
 Morgan Spring Co. .... 5  
 Morley Bros. .... 104  
 Morris, P. Hollingsworth. .... 35  
 Morrison, Robert. .... 42  
 More Twist Drill & Mch. Co. .... 39  
 Morse, Williams & Co. .... 51  
 Morton, Thos. .... 121  
 Morton Mfg. Co. .... 25  
 Moseley Iron Bridge & Tool Co. .... 19  
 Mossberg, Frank Co. .... 91  
 Mossberg & Granville Manufacturing Co. .... 77  
 Mt. Vernon Pattern & Model Wks. .... 80  
 Mugford, A. .... 62  
 Murdock Parlor Grate Co. .... 62  
 Myers, F. E. & Bro. .... 105

**Pittsburgh Screw & Bolt Co.** .... 16  
 Pittsburgh Shear, Knife & Machine Co. .... 69  
 Pittsburgh Steel Shafting Co. .... 29  
 Pleuger & Henger Mfg. Co. .... 130  
 Plume & Atwood Mfg. Co. .... 2  
 Plymouth Mills. .... 14  
 Pneumatic Crane Co. .... 51  
 Poinier & Lester. .... 35  
 Pollock, W. B. Co. .... 42  
 Pond Machine Tool Co. .... 74  
 Poole, Robt. & Son Co. .... 45  
 Port Chester Bolt & Nut Co. .... 18  
 Potter & Johnston Co. .... 73  
 Potts, Horace T. & Co. .... 28  
 Poultner & Co. .... 80  
 Pratt Chuck Co. .... 89  
 Pratt & Whitney Co. .... 78  
 Prentiss Bros. Co. .... 78  
 Prentiss, Geo. W. & Co. .... 8  
 Prentiss Tool & Supply Co. .... 82  
 Putnam Vise Co. .... 113  
 Presbrey Fire Brick Co. .... 34  
 Pugh, Job T. .... 99  
 Pullman, J. Wesley. .... 28  
 Pullman Sash Balance Co. .... 122  
 Putnam Nail Co. .... 127

**Q**  
 Quint, A. D. .... 63

**R**

Rand Drill Co. .... 45  
 Randolph-Clowes Co. .... 2  
 Rawson Electric Co. .... 129  
 Read, A. P. & Co. .... 112  
 Read, Wm. A. & Co. .... 84  
 Reading Crane & Hoist Works. .... 52  
 Reading Hardware Co. .... 95  
 Reading Screw Co. .... 6  
 Red Jacket Mfg. Co. .... 105  
 Reece, E. F. Co. .... 62  
 Reed & Curtis Mch. Screw Co. .... 63  
 Reeves, Paul S. .... 140  
 Remington Arms Co. .... 123  
 Republic Iron & Steel Co. .... 14 & 139  
 R. I. Perkins Horse Shoe Co. .... 126  
 Rhode Island Tool Co. .... 17  
 Richard Mfg. Co. .... 47  
 Richmond Cedar Works. .... 117  
 Ridgway, Craig & Son Co. .... 49  
 Riptley & Hartlett. .... 18  
 Ritter-Conley Mfg. Co. .... 19  
 Rockford Bolt Works. .... 17  
 Rockwell Engineering Co. .... 39  
 Rogers, M. H. .... 87  
 Rogers, Jno. M. Boat, Gauge & Drill Wks. .... 71  
 Rossiter, McGovern & Co. .... 81  
 Rossman Woven Wire Fence Co. .... 8  
 Rowland, William & Harvey. .... 140  
 Rudolph & Krummel. .... 62  
 Rutter, A. T. .... 2  
 Ryan, J. J. & Co. .... 2

**S**

Sabin Machine Co. .... 5  
 Safety Emery Wheel Co. .... 56  
 Saginaw Mfg. Co. .... 47  
 St. John Spring Co. .... 5  
 St. Joseph Pump & Mfg. Co. .... 117  
 St. Louis Electropype Foundry. .... 91  
 St. Louis Shovel Co. .... 129  
 Samson Cordage Works. .... 1  
 Samuel, Frank. .... 26  
 Saunders' Sons, D. .... 61  
 Sawyer Tool Co. .... 94  
 Scaife, Wm. B. & Sons. .... 19  
 Scheeler's Sons. .... 8  
 Schneider & Trenamp Co. .... 106  
 Schrayers, M. Sons & Co. .... 99  
 Schumacher & Boye. .... 70  
 Schwerdtle & Siebert. .... 113  
 Scott, Chas. Spring Co. .... 8  
 Scott, Geo. M. .... 35  
 Scovill Mfg. Co. .... 3  
 Scranton Fencing Co. .... 123  
 Scranton & Co., The. .... 63  
 Seaman, D. C. & Co. .... 14  
 Seaman, Sleeth Co. .... 32  
 Seidel & Hastings Co. .... 26  
 Sellers, Wm. & Co. .... 52  
 Seneca Falls Mfg. Co. .... 67  
 Sennett, Geo. B. Co. .... 43  
 Sessions Foundry Co. .... 38  
 Seward, M. & Son Co. .... 126  
 Seyfert's Sons, L. F. .... 80  
 Shaw, E. M. .... 30  
 Sheffield Car Co. .... 133  
 Shefton Co. .... 49  
 Shimer, H. M. & Co. .... 5  
 Shonberg, I. .... 5  
 Shultz Belting Co. .... 1  
 Shuster, F. R. Co. .... 63  
 Sibley & Ware. .... 65  
 Pike Mfg. Co. .... 93  
 Pilling & Crane. .... 1  
 Pitkin, A. B. Machinery Co. .... 82  
 Pittsburgh Mfg. Co. .... 53  
 Pittsburgh Reduction Co. .... 92

Silver Mfg. Co. .... 63  
 Simonds Mfg. Co. .... 96  
 Simplex Time Recorder Co. .... 114  
 Singer, Nimick & Co. .... 29  
 Skinner Chuck Works. .... 62  
 State, Dwight Mch. Co. .... 63  
 Slocumb, J. T. & Co. .... 112  
 Sloss Shefield Steel & Iron Co. .... 23  
 Smith & Caffrey. .... 37  
 Smith & Egge Mfg. Co. .... 106  
 Smith & Hemenway Co. .... 109  
 Smith, M. B. Co. .... 57  
 Smooth On Mfg. Co. .... 67  
 Smythe, S. R. Co., Inc. .... 33  
 Snell Mfg. Co. .... 102  
 Snow, L. T. .... 139  
 Snow Flake Axle Grease Co. .... 104  
 Snyder, W. P. & Co. .... 27  
 Sommer's Son, John. .... 140  
 Southern Railway Co. .... 91  
 Southwark Fdry. & Mch. Co. .... 43  
 Spedel, J. G. .... 47  
 Spencer's I. S. Sons. .... 34  
 Spencer Automatic Mch. Screw Co. .... 140  
 Spencer Wire Co. .... 13  
 Spofford, W. S. & Son. .... 34  
 Springfield Drop Forging Co. .... 123  
 Springfield Mch. Screw Co. .... 110  
 Springfield Mfg. Co. .... 58  
 Standard Chain Co. .... 103  
 Standard Co. .... 118  
 Standard Fdry. & Mfg. Co. .... 34  
 Standard Scale & Supply Co. .... 69  
 Standard Tool Co. .... 58  
 Standard Varnian Works. .... 116  
 Stanley Rule & Level Co. .... 103  
 Stanley Works. .... 121  
 Star Heel Plate Co. .... 107  
 Star Mfg. Co. .... 112  
 Starr Bros. Bell Co. .... 128  
 Starrett, L. S. Co. .... 110  
 Staten Island Clay Co. .... 24  
 Steel Rail Supply Co. .... 87  
 Sterling Emery Wheel Mfg. Co. .... 56  
 Stevens, J. Arms & Tool Co. .... 86  
 Stewart D. M. Mfg. Co. .... 101  
 Steward & Romaline Mfg. Co., Ltd. .... 18  
 Stewart Iron Works. .... 9  
 Stewart Wire Co. .... 6  
 Stocking, E. B. .... 7  
 Stokes Bros. Mfg. Co. .... 112  
 Storm Mfg. Co. .... 130  
 Stoutenburg Mfg. Co. .... 116  
 Stow Flexible Shaft Co. .... 58  
 Stow Mfg. Co. .... 59  
 Stowell Mfg. & Fdry. Co. .... 120  
 Streeter, N. R. & Co. .... 119  
 Stribley & Poote Co. .... 124  
 Sturtevant, B. F. Co. .... 73  
 Summit Wire Co. .... 8  
 Superior Charcoal Iron Co. .... 26  
 Suppled Hardware Co. .... 98  
 Sweetzer, W. A. .... 19  
 Swindell, W. & Bros. .... 39  
 Syracuse Chilled Plow Co. .... 129  
 Syracuse Smelting Works. .... 4

**T**

Tabor Mfg. Co. .... 43  
 Taintor Mfg. Co. .... 113  
 Talcott, W. O. .... 49  
 Tanite Co. .... 140  
 Taunton Locomotive Mfg. Co. .... 41  
 Taylor's Chas. Sons Co. .... 35  
 Tennessee Coal, Iron & R. R. Co. .... 23  
 The Auto. Shovel Co. .... 52  
 Thomas & Lowe Machinery Co. .... 83  
 Thomas, Theodore. .... 69  
 Thompson, Hugh L. .... 29  
 Thomson, W. H. & Co. .... 23  
 Thomson Bros. & Co. .... 103  
 Thurston Mfg. Co. .... 64  
 Tiebout, W. J. .... 104  
 Titchener, E. H. & Co. .... 16  
 Titusville Forge Co. .... 35  
 Tod, Wm. & Co. .... 43  
 Toohey, Frank. .... 20  
 Totten & Hogg Iron & Steel Fdy. Co. .... 32  
 Townsend, C. C. & E. P. .... 17  
 Transus & Williams Co. .... 126  
 Trenton Iron Co. .... 4  
 Trethewey, Sam'l & Co., Ltd. .... 29  
 Trimont Mfg. Co. .... 118  
 Turner, Vaughn & Taylor Co. .... 11  
 Tyler, W. S. Co. .... 92

**U**

Uehling, Steinbart & Co., Ltd. .... 32  
 Union Mfg. Co. .... 60  
 Union Mfg. Co. .... 110  
 Union Metallic Cartridge Co. .... 1  
 Union Steel Casting Co. .... 52  
 United Metals Selling Co. .... 3  
 United Wire Co. .... 42  
 U. S. Cast Iron Pipe & Foundry Co. .... 25  
 U. S. Cloth Pin Co. .... 113  
 U. S. Electro Galvanizing Co. .... 4  
 U. S. Projectile Co. .... 73

U. S. Steel Lock Co. .... 121  
 Universal Machine Co. .... 58  
 Up-to-date Mfg. Co. .... 4  
 Utica Drop Forge & Tool Co. .... 109

**V**

Valentine, M. D. & Bro. .... 34  
 Van Dorn Iron Works Co. .... 190  
 Van Waggoner & Williams Hardware Co. .... 140  
 Variety Machine Co. .... 33  
 Vizcaino Iron, Coal & Coke Co. .... 25  
 Vitrified Emery Wheel Co. .... 54  
 Vulcan Iron Works. .... 58  
 Vulcanus Forging Co. .... 36

**W**

Waggoner Watchman Clock Co. .... 14  
 Wallace, Wm. H. & Co. .... 3  
 Wardlow, S. & C. .... 21  
 Ward, Edgar T. & Sons. .... 32  
 Warren City Boiler Works. .... 42  
 Warren, J. D. Mfg. Co. .... 118  
 Washburn Shops. .... 54  
 Washington Coal & Coke Co. .... 37  
 Waterbury Brass Co. .... 2  
 Waterbury Farrel Foundry & Machine Co. .... 18  
 Waterbury Rope Co. .... 6  
 Watson, E. P. .... 42  
 Watson, N. A. .... 41  
 Watson-Stillman Co. .... 61  
 Wayne, Anthony Mfg. Co. .... 114  
 Weber Gas & Gasoline Engine Co. .... 120  
 Webster, Warren & Co. .... 41  
 Welch, T. F. Mfg. Co. .... 2  
 Wellman Seaver Engineering Co. .... 141  
 Wells Bros. & Co. .... 37  
 Western Foundry Co. .... 89  
 Westinghouse Electric & Mfg. Co. .... 141  
 West Side Foundry Co. .... 38  
 Wetherill, Robt. & Co. .... 139  
 Wheeler, Mifflin & Co. .... 31  
 Wheeling Hinge Co. .... 91  
 Wheelock, Lovejoy & Co. .... 27  
 Whitcomb Mfg. Co. .... 68  
 White, L. & J. Co. .... 99  
 White Mt. Freezer Co. .... 104  
 Whitehurst, R. W. & Co. .... 130  
 Whiting Mfg. Co. .... 98  
 Whitlock Coil Pipe Co. .... 42  
 Whitton, D. E. Mch. Co. .... 60  
 Wickwire Bros. .... 13  
 Wiebusch & Hilger, Ltd. .... 108  
 Wilbraham-Baker Blower Co. .... 72  
 Wilcox Mfg. Co. .... 128  
 Wilder, S. & Co. .... 105  
 Wiley & Russell Mfg. Co. .... 12 & 149  
 Williams, A. C. .... 117  
 Williams, J. H. & Co. .... 56  
 Williams, White & Co. .... 67  
 Williamsport Wire Rope Co. .... 7  
 Wilson Aluminum Co. .... 37  
 Wilmart & Morman Co. .... 55  
 Wilmot & Hobbs Mfg. Co. .... 12 & 14  
 Wilson, E. H. & Co. .... 31  
 Wilson, E. H. & Co. .... 122  
 Wilson, H. P. & H. F. .... 7  
 Wilson & Smith. .... 19  
 Wilson, W. A. .... 65  
 Windsor Machine Co. .... 72  
 Winter, R. G. .... 120  
 Winter Bros. .... 57  
 Wire Goods Co. .... 7  
 Wister, Francis. .... 38  
 Wister, L. & R. & Co. .... 28 & 31  
 Withington & Cooley Mfg. Co. .... 117  
 Wolff, R. H. & Co., Ltd. .... 3  
 Wood, Alan & Co. .... 78  
 Wood, Jno. Mfg. Co. .... 42  
 Wood, R. D. & Co. .... 38  
 Wood, Wm. T. & Co. .... 101  
 Woodman, R. Mfg. & Sup. Co. .... 125  
 Woodruff, O. D. .... 114  
 Woodruff, Walter W. & Sons. .... 128  
 Woods, T. B. Sons. .... 45  
 Woolley Fdry. & Mch. Wks. .... 41  
 Worcester Mch. Screw Co. .... 85  
 Wormer, C. C. Mchry. Co. .... 85  
 Wright & Colton Wire Cloth Co. .... 12  
 Wrightsville Hdw. Co. .... 31  
 Wurster, F. W. & Co. .... 131  
 Wyman & Gordon. .... 134

**Y**

York, S. M. Co. .... 80  
 York Mfg. Co. .... 35  
 Young, W. C. Mfg. Co. .... 68  
 Youngstown Fdry. & Mch. Co. .... 31  
 Youngstown Iron & Steel Roofing Co. .... 4  
 Published by DAVID WILLIAMS Co., 223-225 William St., New York. Printed by THE WILLIAMS PRINTING Co., General Book, Commercial and Newspaper Printers and Binders, 232-233 William St., New York.

# CLASSIFIED LIST OF ADVERTISERS.

## Agricultural Implements

Continental Tool Co., Franklin, N. Y.  
Coca Farming Tool Co., Ft. Madison, Ia.  
Washington & Cooley Mfg. Co., Jackson, Mich.

## Air Compressors

Air Machinery Co., Pittsburgh, Pa.  
Clevton Air Compressor Works, 20 Cortland St., New York.

Consolidated-Sergeant Drill Co., 26 Cortland St., N. Y.

N. Y. Air Compressor Co., 120 Liberty St., N. Y.

Norwalk Iron Works, 8, Norwalk, Ct.

Pedrick & Aver Co., Philadelphia, Pa.

Rand Drill Co., 100 Broadway, N. Y.

## Air Pumps

Garrison-Peters Air Pump Co., Houston and Mercer Sts., N. Y.

## Air Moving Machinery

Howard & Morse, 45 Fulton St., N. Y.

## Air Rifles

Markham Air Rifle Co., Plymouth, Mich.

## Alloys

Blackwell, G. G. Sons & Co., Ltd., Liverpool, England.

## Aluminum

Janney, Steinmetz & Co., Phila., Pa.

Pittsburgh Reduction Co., Pittsburgh.

## Aluminum, Brass and Bronze

Clark, John W., Albany, N. Y.

## Aluminum Tubing

Ivins, Elwood, 457 Broadway, N. Y.

## Ammunition

Garrison Cartridge Co., Cincinnati, O.

Union Metallic Cartridge Co., 313-315

Broadway, N. Y.

## Annealing Boxes

Warren City Boiler Wks., Warren, O.

## Anti-Friction Metals—See Babbitt Metal.

## Anti-Rust.

Hunter Chemical Co., Phila., Pa.

## Anvils

Chicago House Wrecking Co., Chicago.

Eagle Anvil Works, Trenton, N. J.

Bay-Budden Mfg. Co., Brooklyn, N. Y.

## Anvil and Vise (Combination)

Fulton Iron & Eng. Works, Detroit, Mich.

## Apple Parers

Conwell Co., Antrim, N. H.

Hudson Parer Co., Leominster, Mass.

Reading Hardware Co., Reading, Pa.

## Appraisers

American Appraisal Co., Milwaukee, Wis.

## Aprons, Leather

Hull & H. Y. Co., Danbury, Conn.

## Arbor Press

Seneca Falls Mfg. Co., Seneca Falls, N. Y.

## Art Lamps

General Electric Co., Schenectady, N. Y.

## Auctioneers

Bissell, E. & Co., N. Y.

## Auger Bits

Bridgeport Gun Implement Co., 313-315

Broadway, N. Y.

Ford Bit Co., Holyoke, Mass.

Jennings, Russell Mfg. Co., Deep River Conn.

Jennings, C. E. Co., 101 Reade St., N. Y.

Mayhew, H. H. Co., Sheburne Falls, Mass.

Pugh, Joe T., Phila., Pa.

Shaw Mfg. Co., Fiskdale, Mass.

## Automatic Machines

Automatic Mch. Co., Bridgeport, Conn.

Cross & Spels Machine Co., Waterbury, Conn.

Manville, E. J. Mch. Co., Waterbury, Ct.

Nilson, A. H. Mch. Co., Bridgeport, Ct.

Spencer Automatic Mch. Screw Co., Hartford, Conn.

## Awning Hardware

Garland Chain Co., Rankin, Pa.

## Awning Hooks

Wheeling Hinge Co., Wheeling, W. Va.

## Axe Wedges

Woodruff, W. W. & Sons, Mt. Carmel, Ct.

## Babbitt Metal

Hertz, T. & Son, St. Louis, Mo.

Magnolia Metal Co., 265-267 West St., N. Y.

Markle Lead Works, St. Louis, Mo.

Merchant & Co., Inc., Philadelphia, Pa.

Reeves, Paul S., Philadelphia, Pa.

Shimer, H. M. & Co., Phila., Pa.

Shonberg, L., 172 Hudson St., N. Y.

Syracuse Smelting Wks., Syracuse, N. Y.

## Bale Ties

Griswold Wire Co., Braddock, Pa.

Kilmer Wire Mfg. Co., Chicago, Ill.

Wetherill, H. P. & H. F., 377 573 Tenth Ave., N. Y.

## Ball Flints

Naugatuck Mfg. Co., Naugatuck, Conn.

## Balls

Cleveland Ball & Screw Co., Cleveland, Ohio.

## Bank and Office Railing

Eccy Wire Works Co., 65 Fulton St., N. Y.

## Barb Wire and Fence

Dillon-Griswold Wire Co., Sterling, Ill.

## Bar Iron

Allentown Rolling Mill, Allentown, Pa.

American Iron & Steel Mfg. Co., Lebanon, Pa.

American Steel Hoop Co., Battery Park Building, N. Y.

Brown & Co., Inc., Pittsburgh, Pa.

Golden Iron Co., Troy, N. Y.

Chain Iron & Steel Co., Muskegon, Mich.

Consolidated Iron & Steel Co., Bristol, Pa.

Khart Iron & Steel Co., Pittsburgh,

Union Iron & Steel Co., Burnham, Pa.

National Steel Co., Bridgeport, O.

Public Iron & Steel Co., Chicago, Ill.

Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.

Virginia Coal & Coke Co., Bristol, Tenn.

## Bearings

Ball Bearing Co., Boston, Mass.

## Ball Tapping Knives

King, E. C. & Co., Indianapolis, Ind.

## Bellows

Scott, Geo. M., Chicago, Ill.

## Bells and Gongs

Beyn Bros. Mfg. Co., East Hampton Hill, N. N. Brass Co., E. Hampton, C.

Mossberg, Frank Co., Attleboro, Mass.

Starr Bros. Bell Co., Easthampton Ct.

## Belt Dressing

Dixon, Jos., Crucible Co., Jersey City, N. J.

## Belt Hooks

Bristol Co., Waterbury, Conn.

Talcott, W. O. Providence, R. I.

## Belt Studs

Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

## Beltting

Alexander Bros., 412 N. 8d, Phila., Pa.

Ames Sword Co., Chicopee, Mass.

Boston Belting Co., Boston, Mass.

Machinists' Supply Co., Rochester, N. Y.

Peerless Rubber Mfg. Co., 16 Warren St., New York.

Shultz Belting Co., St. Louis, Mo.

## Beltting, Chain

Buhl Malleable Co., Detroit, Mich.

Jeffrey Mfg. Columbus, O.

Link-Belt Engineering Co., Phila., Pa.

## Bending Rolls

Hillies & Jones Co., Wilmington, Del.

New Doty Mfg. Co., Janesville, Wis.

Niles Tool Works Co., 156-158 Liberty St., N. Y.

## Bicycle Bells—See Bells and Gongs.

## Bicycle Chains

Bridgeport Chain Co., Bridgeport, Ct.

## Bicycle Lamps

Bridgeport Brass Co., Bridgeport, Conn.

## Bicycle Lamps

Bridgeport Brass Co., Bridgeport, Conn.

## Bicycle Machinery

Hillies & Jones Co., Wilmington, Del.

New Doty Mfg. Co., Janesville, Wis.

Niles Tool Works Co., 156-158 Liberty St., N. Y.

## Bicycle Parts

Davis & Buxton Stamping Co., Worcester, Mass.

Houghton & Buxton Mfg. Co., Worcester, Mass.

Pittsburgh Screw & Bolt Co., Pittsburgh.

Springfield Machine Screw Co., Springfield, Mass.

Standard Tool Co., Cleveland, O.

## Bicycle Pumps

Gleason-Peters Air Pump Co., Houston and Mercer Sts., N. Y.

## Bicycle Spokes

Excelsior Needle Co., Torrington, Ct.

## Bicycle Sundries

Beyn Bros. Mfg. Co., E. Hampton, Mass.

Bridgeport Gun Implement Co., 313-315

Broadway, N. Y.

Hill, N. N. Brass Co., E. Hampton, Ct.

Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

Smith & Egge Mfg. Co., Bridgeport, Ct.

Supplee Hdw. Co., Phila., Pa.

## Bicycle Wrenches

Springfield Drop Forging Co., Springfield, Mass.

Star Mfg. Co., Carpentersville, Ill.

## Binder Twine

American Mfg. Co., 65 Wall St., N. Y.

## Bird Cages

Hendry, Andrew B. Co., New Haven, Conn.

## Bits

Conn. Valley Mfg. Co., Centerbrook, Ct.

Norton Mfg. Co., Chester, Conn.

## Bit Braces

Mason & Parker, Winchendon, Mass.

## Black Plate

American Tin Plate Co., N. Y.

Champion Iron & Steel Co., Muskegon, Mich.

## Blast Forges

Miner & Peck Mfg. Co., New Haven, Ct.

## Blocks, Tackle

Boston & Lockport Block Co., Boston.

Fulton Iron & Eng. Wks., Detroit, Mich.

Lane Bros. Co., Poughkeepsie, N. Y.

## Blowers

American Blower Co., Detroit, Mich.

Ash, T. A., 109 Liberty St., N. Y.

Bailey, Wm. & Sons Co., Milwaukee, Wis.

Boston Blower Co., Hyde Park, Mass.

Buffalo Forge Co., Buffalo, N. Y.

Champion Blower & Forge Co., Lancaster, Pa.

Cornell, J. B. & J. M., 26th St. and 11th Ave., New York City.

Exeter Machine Wks., Boston, Mass.

N. Y. Blower Co., Bucyrus, O.

Sturtevant, F. C. Co., Boston, Mass.

Wilbraham Baker Blower Co., Phila., Pa.

## Boat Hardware

Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

## Boiler Makers' Machinery

Pintee Bros., Worcester, Mass.

## Boiler Plates

Lukens Iron & Steel Co., Coatesville, Pa.

Seidel & Hastings Co., Wilmington, Del.

## Boiler Tubes

Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

## Boilers' Machinery

Pintee Bros., Worcester, Mass.

## Boiler Plates

Lukens Iron & Steel Co., Coatesville, Pa.

## Boiler Tubes

Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

## Boiler Tubes

National Tube Co., Pittsburgh, Pa.

## Boilers, Steam

Babcock & Wilcox Co., 20 Cortland St. Cahill Sales Dept., Pittsburgh, Pa.

Harrison Safety Boiler Wks., Phila., Pa.

Pollock, W. & Co., Youngstown, O.

Watson, E. P., Elizabeth, N. J.

Wetherill, Robt. & Co., Chester, Pa.

Wood, Jno. Mfg. Co., Conshohocken, Pa.

## Bolts Cutters

Chambers Bros., Philadelphia, Pa.

Sellers, Wm. & Co., Inc., Phila., Pa.

## Bolt Studs

Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

## Bolts

American Iron & Steel Mfg. Co., Lebanon, Pa.

American Screw Co., Providence, R. I.

Blake & Johnson, Waterbury, Conn.

Dunham Nut Co., Unionville, Conn.

Franklin-Moore Co., Winsted, Conn.

Hall's Sam'l Sons, 229 W. 10th St., N. Y.

Haskell, Wm. H. Mfg. Co., Pawtucket, R. I.

Ladd, W. C., Bristol, Conn.

National Elastic Nut Co., Milwaukee, Wis.

Pittsburgh Screw & Bolt Co., Pittsburgh.

New England Steel Castings Co., Philadelphia, Pa.  
Otis Steel Co., Ltd., Cleveland, Ohio  
Shaw, E. M., Providence, R. I.  
Union Steel Casting Co., Pittsburgh, Pa.

**Catalogue Files**  
Folding Paper Box Co., So. Bend, Ind.

**Ceilings, Metal**  
Young's Own Iron & Steel Roofing Co., Youngstown, O.

**Cements, Iron**  
Smooth On Mfg. Co., Jersey City N. J.

**Chain**  
Bradlee & Co., Philadelphia.  
Bridgeport Chain Co., Bridgeport, Ct.  
Culicott-Evans Chain Co., Allegheny, Pa.  
Garland Chain Co., Rankin, Pa.  
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.  
Jenkins Iron & Tool Co., Howard, Pa.  
Link-Belt Engineering Co., Phila., Pa.  
McKay Jas. & Co., Pittsburgh, Pa.  
Nicholson & Co., Pittsburgh, Pa.  
Oneida Community, Ltd., Niagara Falls Stand rd Chain Co., Pittsburgh, Pa.

**Chain Plants**  
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

**Chemicals**  
F. M. & Amend, New York.

**Cherry Stoners.**  
Enterprise Mfg. Co., Philadelphia, Pa.  
Goodell Co., Antrim, N. H.

**Chisels**  
Buck Bros., Millbury, Mass.  
Buck, Chas., Millbury, Mass.  
Jennings, C. E. Co., 161 Reade St., N. Y.  
White, L. & J. Co., Buffalo, N. Y.

**Christmas Tree Holders**  
North Bros. Mfg. Co., Philadelphia, Pa.

**Chucks**  
Cushman Chuck Co., Hartford, Conn.  
Doebler Mfg. Co., Middletown, Conn.  
Goodell Frost Co., Greenwich, Mass.  
Hogenson & Peck Mfg. Co., New Haven, Conn.  
Holland Mfg. Co., Eng., Pa.  
Horten, E. & Son Co., Windsor Locks, Ct.  
Ideal Machine Works, Hartford, Conn.  
Pratt Chuck Co., Frankfort, N. Y.  
Skinner Chuck Co., New Britain, Conn.  
Standard Tool Co., Cleveland, O.  
Union Mfg. Co., 103 Chambers, N. Y.  
Whitton, D. E. Mach. Co., New London, Conn.

**Cider Mills**  
Witt Hurst, R. W. & Co., Norfolk, Va.

**Circular Sawing Machines**  
Kidder, R. E., Worcester, Mass.

**Clamps**  
Beasley, C. H. & Co., Chicago, Ill.  
Hill, Thos., Brooklyn, N. Y.  
Hammer & Co., Bradford, Conn.

**Clipping Machines**  
Aldis, Shearer Mfg. Co., Nashua, N. H.  
Chicago Flexible Shaft Co., Chicago, Ill.  
McCoy, Jas. F. Co., 26 Warren St., N. Y.  
Wiebusch & Hilger, Ltd., 9-15 Murray St., N. Y.

**Clothes Dryers**  
Hill Dryer Co., Worcester, Mass.

**Clothes Line Hook**  
Wilson, E. H. & Co., Allston, Mass.

**Clothes Pins**  
U. S. Clothes Pin Co., Montpelier, Vt.

**Coal**  
Alabama Consolidated Coal & Iron Co., Birmingham, Ala.  
Sloss & Shefford Steel & Iron Co., Birmingham, Ala.  
Washington Coal & Coke Co., Dawson, Pa.  
Wister, Francis, Philadelphia, Pa.

**Coal Cars**  
Lansing Wheelbarrow Co., Lansing, Mich.

**Coal Picks**  
Jenkins Iron & Tool Co., Howard, Pa.

**Coal Shutes**  
Lansing Wheelbarrow Co., Lansing, Mich.

**Coffee and Spice Mills**  
Arcade Mfg. Co., Freeport, Ill.  
Parker, Chas. Co., Meriden, Conn.

**Coke**  
Alabama Consolidated Coal & Iron Co., Birmingham, Ala.  
Bessemer Coke Co., Pittsburgh, Pa.  
Cherry Valley Iron Co., Pittsburgh, Pa.  
Dimmick, J. K. & Co., Phila., Pa.  
Frick, H. C. Coke Co., Pittsburgh, Pa.  
Houston, C. B. & Co., Philadelphia, Pa.  
Sloss & Shefford Steel & Iron Co., Birmingham, Ala.  
Tennessee Coal, Iron & R. E. Co., Birmingham, Ala.  
Virginia Iron, Coal & Coke Co., Bristol, Va., Tenn.  
Washington Coal & Coke Co., Dawson, Pa.  
Wister, Francis, Philadelphia, Pa.

**Colleges**  
Michigan College of Mines, Houghton, Mich.

**Compressed Air Machinery**  
Phila. Pneumatic Tool Co., Phila., Pa.

**Conductor Pipe**  
Berger Bros. Co., Philadelphia, Pa.

**Conveying Machinery**  
Aultman Co., Canton, Ohio.  
Brown Hoisting & Conveying Machine Co., Cleveland, Ohio.  
California Wire Works, San Francisco, Calif.  
Hunt, C. W. Co., W. New Brighton, N. Y.  
Jeffrey Mfg. Co., Columbus, O.  
Link-Belt Engineering Co., Phila., Pa.

**Cooking Utensils**  
Cleveland Stamping & Tool Co., Cleveland, O.

**Copine Saw**  
Jones & Dommersas, Chicago, Ill.

**Copper**  
Hendricks Bros., 49 Cliff, N. Y.  
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.  
United Metal Casting Co., 11 Broadway, N. Y.

**Copper Hammers**  
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

**Copper Rivets and Burrs**  
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

**Copper Tacks and Nails**  
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

**Cordage**  
Macomb & W. W. & Co., Chicago.  
Samson Cordage Works, Boston, Mass.  
Silver Lake Co., Boston, Mass.

**Cordage Machinery**  
Hoover & Gamble Co., Miamisburg, O.

**Core Ovens**  
Millet Core Oven Co., Brightwood, Mass.

**Cork Screws and Cork Pullers**  
Erie Specialty Co., Erie, Pa.

**Corn Hooks**  
Withington & Cooley Mfg. Co., Jackson, Mich.

**Corn Huskers**  
Wlcox Mfg. Co., Aurora, Ill.

**Corrugated Iron and Steel**  
Garry Iron & Steel Roofing Co., Cleveland, O.  
McCloughan Iron Co., Wilmington, Del.  
Scate, Wm. B. & Sons, Pittsburgh.

**Cotter Pin Machines, Automatic**  
Shuster, F. B. Co., New Haven, Conn.

**Cotton Ties**  
American Steel Hoop Co., Battery Park Building, N. Y.

**Counting Machines**  
Durant, W. N. Milwaukee, Wis.

**Couplings, Compression**  
Sennett, Geo. B. Co., Youngstown, O.

**Cow Ties**  
Garland Chain Co., Rankin, Pa.  
Oneida Community, Ltd., Niagara Falls, N. Y.

**Cranes**  
Brown Hoisting & Conveying Mch. Co., Cleveland, O.  
Chisholm & Moore Mfg. Co., Cleveland, O.  
Cleveland Crane & Car Co., Cleveland, O.  
Niles Tool Works Co., 136-138 Liberty St., N. Y.  
Northern Engineering Works, Detroit, Mich.  
Fwling & Harnischfeger, Milwaukee, Wis.  
Pneumatic Crane Co., Pittsburgh, Pa.  
Reading Crane & Hoist Wks., Reading, Pa.  
Ridgway, Craig & Son Co., Coatesville, Pa.  
Speidel, J. G., Reading, Pa.

**Crayon**  
Ftward, D. M. Mfg. Co., Chattanooga, Tenn.

**Crucibles**  
Dixon, Jas. Crucible Co., Jersey City, N. J.

**Cupolas**  
Paxson, J. W. Co., Philadelphia, Pa.

**Cupolas, Hot Blast**  
Byram & Co., Detroit, Mich.

**Curry Combs**  
New York Stamping Co., Brooklyn, N. Y.

**Cutter**  
Cattaraugus Cutlery Co., Little Valley, N. Y.  
Chaffton, John & Sons, 85 to 89 Cliff St., N. Y.  
Dame, Stoddard & Co., Boston.  
Goodell Co., Antrim, N. H.  
Kimball, C. J. Co., Bennington, N. H.  
Smith & Hemenway Co., 206 Broadway, N. Y.  
Wiebusch & Hilger, Ltd., 9 to 15 Murray St., N. Y.

**Cutting Off Machines**  
Hurlbut Rogers Mach. Co., So. Sudbury, Mass.

**Damper**  
Logan & Strobridge Iron Co., New Brighton, Pa.  
Williams, A. C., Ravenna, O.

**Dashes and Fenders**  
McKinnon Dash Co., Buffalo, N. Y.

**Diamond Tools**  
Dickinson, Thos. L., 6 Vesey St., N. Y.

**Dies**  
Adriance Mach. Works, Brooklyn, N. Y.  
American Hd. Mfg. Co., Ottawa, Ill.  
Bliss, E. W. Co., Brooklyn, N. Y.  
Ferracutte Mach. Co., Bridgeport, N. J.  
Hay-Budden Mfg. Co., Brooklyn, N. Y.  
Mossberg, Frank Co., Attleboro, Mass.  
Richard Mfg. Co., Bloomsburg, Pa.  
Wilson & Smith, Worcester, Mass.

**Door Bells.—See Bells and Gongs.**

**Door Checks and Springs**  
Bardale, Jas., 147-151 Baxter St., N. Y.  
Pullman Safe Balmico Co., Rochester, N. Y.

**Door Holders**  
Caldwell Mfg. Co., Rochester, N. Y.

**Draught Springs**  
Burditt & Williams, Boston, Mass.

**Draw Benches**  
Richard Mfg. Co., Bloomsburg, Pa.  
Thompson, Hugh L., Waterbury, Ct.

**Drill Grinders**  
Head, W. S. & Son, Barre, Mass.  
Seller, Wm. & Co., Inc., Phila., Pa.  
Washburn Shop of Worcester Polytechnic Inst., Worcester, Mass.  
Wilmarth & Norman, Grand Rapids, Mich.

**Drilling Machines**  
Aurora Tool Works, Aurora, Ind.  
Barnes, R. F. Co., Rockford, Ill.  
Barnes, W. F. & J. H. Co., Rockford, Ill.  
Bausch Mch. Tool Co., Springfield, Mass.  
Bement, Miles & Co., Phila., Pa.  
Bullard Drill & Tool Co., Chi., Ohio.  
Bullard Machine Tool Co., Bridgeport, Ct.

Burnham, Geo. Co., Worcester, Mass.  
Champion Blower & Forge Co., Lancaster, Pa.

Cincinnati Mch. Tool Co., Cincinnati, O.  
Dallett, Thos. H. & Co., Philadelphia.  
D'Amour & Littlefield Mch. Co., 131 Worth St., N. Y.  
Davis, W. F., Machine Co., Rochester, N. Y.

Detrick & Harvey Mch. Co., Baltimore, Md.

Drees, Mueller & Co., Cincinnati, O.  
Fosdick & Holloway Mch. Tool Co., Cincinnati, O.

Harrington, E. Son & Co., Phila., Pa.  
Hill, Clarke & Co., Boston, Mass.  
Hoefer Mfg. Co., Freeport, Ill.  
Katz, John, Phila., Pa.

Prentice Bros., Worcester, Mass.  
Quint, A. D., Hartford, Conn.  
Shuster, F. B. Co., New Haven, Conn.  
Sibley & Ware, So. Bend, Ind.  
Sigourney Tool Co., Hartford, Conn.  
Silver Mfg. Co., Salem, O.  
State Dwight Machine Co., Hartford, Ct.

Stow Flexible Shaft Co., Phila., Pa.  
Wiley & Russell Mfg. Co., Greenfield, Mass.  
York, S. M. Co., Cleveland, O.

**Drilling Machines, Automatic**  
Gould & Eberhardt, Newark, N. J.

**Drills, Pneumatic**  
Chicago Pneumatic Tool Co., Chicago, Ill.

**Drive Chains**  
Locke Steel Belt Co., Bridgeport, Conn.

**Drop Forgings**  
Belden Machine Co., New Haven, Conn.  
Billings & Spencer Co., Hartford, Conn.  
Chicago Drop Forging & Fdry. Co., Kensington, Ill.  
Clapp, E. D. Mfg. Co., Auburn, N. Y.  
Consolidated Railway Electric Lighting & Equipment Co., 10 Broadway, N. Y.  
Eccles, Richard, Auburn, N. Y.  
Indianapolis Drop Forging Co., Indianapolis, Ind.  
Keystone Drop Forge Co., Philadelphia.  
Kilborn & Bishop Co., New Haven, Conn.  
R. I. Tool Co., Providence, R. I.  
Scranton Forging Co., Scranton, Pa.  
Seward, C. & Son Co., New Haven, Ct.  
Springfield Drop Forging Co., Springfield, Mass.  
Strieby & Foote Co., Newark, N. J.  
Tranier & Williams Co., Alliance, O.  
Williams, J. H. & Co., Brooklyn, N. Y.  
Wymar & Gordon, Worcester, Mass.

**Drop Hammers**  
Billings & Spencer Co., Hartford, Conn.  
Williams, White & Co., Moline, Ill.

**Drop Presses**  
Manville, E. J. Mch. Co., Waterbury, Ct.  
Miner & Peck Mfg. Co., New Haven, Ct.  
Mossberg & Granville Mfg. Co., Providence, R. I.  
Vulcan Iron Works, Chicago, Ill.

**Dumb Waiters**  
Energy Elevator Co., Philadelphia, Pa.

**Edge Tools**  
Buck Bros. Co., Philadelphia, Pa.  
Oatman Bros., Medina, O.

**Eave Trough Hangers**  
Berger Bros. Co., Philadelphia, Pa.  
Oatman Bros., Medina, O.

**Eddy**  
Eddy Electric Mfg. Co., Windsor, Conn.  
General Electric Co., Schenectady, N. Y.  
Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.

**Dump Cars**  
Atlas Bolt & Screw Co., Cleveland, O.

**Dynamos**  
Eddy Electric Mfg. Co., Windsor, Conn.  
General Electric Co., Schenectady, N. Y.  
Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.

**Egg Beaters**  
Lyons, Nelson, Albany, N. Y.  
Standard Co., Boston, Mass.

**Egg Opener**  
Hartigan, W. R., Collinsville, Ct.

**Electric Bells and Supplies**  
Ostrander, W. R. & Co., 204 Fulton St.

**Electric Controllers**  
Electric Controller & Supply Co., Cleveland, O.

**Electric Lighting and Power Apparatus**  
Eddy Electric Mfg. Co., Windsor, Conn.  
General Electric Co., Schenectady, N. Y.

**Electrical Apparatus**  
Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.

**Electrotypes**  
St. Louis Electrotype Foundry, St. Louis, Mo.

**Elevators, Makers of**  
Eastern Machinery Co., New Haven, Ct.  
Energy Elevator Co., Philadelphia, Pa.  
Link-Belt Engineering Co., Phila., Pa.  
Morse, Williams & Co., Phila., Pa.  
Ridgway, Craig & Son Co., Coatesville, Pa.  
Speidel, J. G., Reading, Pa.

**Electricity**  
Variety Machine Co., Warsaw, N. Y.

**Elevator Buckets**  
Clark, W. J. & Co., Salem, O.  
Cleveland Elevator Bucket Co., Cleveland, O.

**Elevator Enclosures and Cabs**  
Ludlow Saylor Wire Co., St. Louis, Mo.

**Emery**  
Tanite Co., Stroudsburg, Pa.

**Emery Wheels**  
American Emery Wheel Works, Providence, R. I.  
Best, L., 6 Vesey St., N. Y.

Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.

Buffalo Emery Wheel Co., Buffalo, N. Y.  
Diamond Mch. Co., Providence, R. I.  
Katz & Bassett, Phila., Pa.  
Northampton Emery Wheel Co., Leida, Mass.  
Norton Emery Wheel Co., Worcester, Mass.

**Fabric**  
Safety Emery Wheel Co., Springfield, O.  
Springfield Mfg. Co., Bridgeport, Conn.  
Sterling Emery Wheel Co., Tiffin, O.  
Tanite Co., Stroudsburg, Pa.  
Vitrified Emery Wheel Co., Westfield, Mass.

**Emery Wheel Dresser**  
Chicago Screw Co., Chicago, Ill.  
Dickinson, Thos. L., 45 Vesey St., N. Y.

**Engineers and Contractors**  
Aiken, Henry, Pittsburgh, Pa.  
Erikson, Edw. E., Pittsburgh, Pa.  
Filer & Stowell Co., Milwaukee, Wis.  
Fitter-Miller Engineering Co., Pittsburgh, Pa.

Hev & Patterson, Pittsburgh, Pa.  
Huber, S. V. Co., Pittsburgh, Pa.  
Kay, G. Ashton, 253 Broadway, N. Y.  
Kennedy, Julian, Pittsburgh, Pa.  
Kennedy, Walter, Pittsburgh, Pa.  
Lamond, David, Pittsburgh, Pa.  
Laughlin, Alex & Co., Pittsburgh, Pa.  
McClure, G. W. Son & Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.  
Penn Engineering Whs., New Castle, Penna.  
Ritter-Conley Mfg. Co., Pittsburgh, Pa.  
Smythe, S. R. Co., Inc., Pittsburgh, Pa.  
Swindell, W. & Bros., Pittsburgh, Pa.  
Thompson, Hugh L., Waterbury, Ct.  
Wellman Seaver Engineering Co., Cleveland, O.

**Engines**  
Gas.  
Metz, Aug., 128-138 Mott St., N. Y.  
Northern Engineering Works, Detroit, Mich.  
Woolley Fdry. & Mch. Works, Anderson, Ind.  
Gasoline.  
Charter Gas Engine Co., Sterling, Ill.  
Weber Gas & Gasoline Engine Co., Kansas City, Mo.  
Watkins, F. M., Cincinnati, O.  
Woolley Fdry. & Mch. Works, Anderson, Ind.  
Kerosene.  
Metz, Aug., 135-138 Mott St., N. Y.  
Steam.  
Allis, E. P. Co., Milwaukee, Wis.  
Boston Blower Co., Hyde Park, Mass.  
Buffalo Forge Co., Buffalo, N. Y.  
Filer & Stowell Co., Milwaukee, Wis.  
Newport News Shipbuilding & Dry Dock Co., 1 Broadway, N. Y.  
Sennett Geo. B. Co., Youngstown, O.  
Southwark Fdry. & Mch. Co., Philadelphia, Pa.  
Sturtevant, B. F. Co., Boston, Mass.  
Todd, William & Co., Youngstown, O.  
Trotter & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.  
Wetherill, Robt. & Co., Chester, Pa.

**Engines, Marine**  
Lake City Engineering Co., Erie, Pa.

**Engines Second Hand**  
Everson, B. M., Pittsburgh, Pa.

**Engravers**  
Mugford, A., Hartford, Conn.

**Expanding Mandrels**  
LeCount, Wm. G., So. Norwalk, Conn.

**Expansion Bolts**  
Church, Isaac Toledo, O.  
McCabe Hanger Mfg. Co., 530-540 W. 2d St., N. Y.

Newhall, Henry B. Co., N. Y.  
Seaman D. C. & Co., Philadelphia, Pa.  
Steward & Komaine Mfg. Co., Phila., Pa.

**Farmers' Tools.**  
Heller Bros. & Co., Newark, N. J.

**Faucets, Wooden**  
Boston & Lockport Block Co., Boston.  
Sommer's, John, Son, Newark, N. J.

**Feed Cutters**  
Silver Mfg. Co., Salem, O.

**Feed Water Heaters and Purlers**  
Harrison Safety Boiler Works, Philadelphia, Pa.  
Kelly, B. F. & Son, 91 Liberty St., N. Y.  
National Pipe Bending Co., New Haven.  
Patterson, F. L., 196 Liberty St., N. Y.  
Taunton Locomotive Mfg. Co., Taunton, Mass.  
Webster, Warren & Co., Camden, N. J.  
Whitlock Oil Pipe Co., Hartford, Ct.

**Fencing, Iron and Wire**  
Adam, W. J., Joliet, Ill.  
American Steel & Wire Co., Chicago, Ill.  
Barnum, E. T., Detroit, Mich.  
Clinton Wire Cloth Co., Clinton, Mass.  
DeKalb Fence Co., DeKalb, Ill.  
Dwiggins Wire Fence Co., Anderson, Ind.  
Ellis & Halfenberger, Indianapolis, Ind.  
Frost Wire Fence Co., Cleveland, O.  
Gilbert & Bennett Mfg. Co., 42 Cliff St., Hartman Mfg. Co., 300 Broadway, N. Y.  
Kilmer Wire Mfg. Co., Chicago, Ill.  
Kokomo Fence Mch. Co., Kokomo, Ind.  
Ludlow Saylor Wire Co., St. Louis, Mo.  
Ornamental Iron & Wire Co., Chattanooga, Tenn.  
Rossman Woven Wire Fence Co., Rossman, N. Y.  
Stewart Iron Works, Cincinnati, Ohio.  
Up-to-date Mfg. Co., Terre Haute, Ind.

**Ferro-chromium**  
Willson Aluminum Co., 99 Cedar Street, N. Y.

**Files and Raspas**  
Manufacturers of  
Arcade File Works, Anderson, Ind.  
Barnett, G. & H. Co., 41 & 43 Richmond Phila.

Diaston, Henry & Sons, Inc., Phila., Pa.  
Heller Bros. Co., Newark, N. J.  
McCaffrey File Co., Philadelphia.  
Nicholson File Co., Providence, R. I.  
Stokes Bros. Mfg. Co., Freehold, N. J.

**Filters**  
Scaife, Wm. B. & Sons, Pittsburgh, Pa.

**Finished Castings**

Franklin, H. H. Mfg. Co., Syracuse, N. Y.

**Fire Brick**Borgner, Cyrus, Philadelphia, Pa.  
Gardner, Bill, Cumberland, Md.  
Harr, W. H., Fire Brick Co., Mt. Union, N. Y.  
Maurer, H. & Sons, 430 E. 23rd, N. Y.  
Ostrander Fire Brick Co., Troy, N. Y.  
Poinier & Lester, Toledo, O.  
Presbrey Fire Brick Co., Taunton, Mass.  
Staten Island Clay Co., Woodbridge, Taylor's, Chas. Sons Co., Cincinnati.  
Valentine, M. D. & Bro. Co., Woodbridge.**Fishing Tackle**

Dame, Stoddard &amp; Co., Boston, Mass.

**Flexible Shafting**Chicago Flexible Shaft Co., Chicago, Ill.  
Stow Flexible Shaft Co., Phila., Pa.  
Stow Mfg. Co., Binghamton, N. Y.**Flinn and Emery Paper**

Baeder, Adamson &amp; Co., Phila., Pa.

**Floor and Ceiling Plates**

Coding Mfg. Co., Bristol, Conn.

**Flue Cleaners**

Jackson Flue Scraper Co., Jackson, Jarecki Mfg. Co., Erie, Pa.

**Fly Killers**Bigelow, J. F., Worcester, Mass.  
Montgomery, R. R. & Co., Decatur, Ill.**Foot Power Emery Wheels**

Buffalo Emery Wheel Co., Buffalo, N. Y.

**Foot Pumps**

Gleason-Peters Air Pump Co., Houston and Mercer Sta., N. Y.

**Foot Rests**

Star Heel Plate Co., Newark, N. J.

**Forges, Portable, &c.**Bradley Co., Syracuse N. Y.  
Champion Blower & Forge Co., Lancaster, Pa.**Forgings, Iron and Steel**Baker, Jas. H. Mfg. Co., Pittsburgh, Pa.  
Bethlehem Steel Co., S. Bethlehem, Pa.  
Eastern Forge Co., Boston, Mass.  
Frankford Steel Co., Phila., Pa.  
Hay-Budden Mfg. Co., Brooklyn, N. Y.  
Ofts Steel Co., Ltd., Cleveland, Ohio.  
Pittsburgh Shear, Knife & Machine Co., Pittsburgh, Pa.**Titusville Forge Co., Titusville, Pa.**

U. S. Project Co., Brooklyn, N. Y.

Vulcanus Forging Co., Cleveland, O.

**Forks, Hay and Manure**Continental Tool Co., Frankfort, N. Y.  
Iowa Farming Tool Co., Ft. Madison, Ia.

Withington &amp; Cooley Mfg. Co., Jackson.

**Foundry Facings**

Obermeyer, S. Co., Cincinnati, O.

**Foundry Lamps**

Forest City Fdy. &amp; Mfg. Co., Cleveland, Paxton, J. W. Co., Phila., Pa.

**Foundry Supplies**Gilmour, J., Bennett Building, N. Y.  
Oberman, S. Co., Cincinnati, Ohio.

Osborn Mfg. Co., Cleveland, O.

Paxton, J. W. Co., Phila., Pa.

Poinier &amp; Lester, Toledo, O.

**Friction Clutches**

Eastern Machinery Co., New Haven, Ct.

**Furnaces, Foundry**

Byram &amp; Co., Detroit, Mich.

**Furnaces, Oil, Gas and Coal**

Rockwell Engineering Co., 25 Cortlandt St., N. Y.

**Fuses**

Ensign Bickford &amp; Co., Simsbury, Ct.

**Gages**

Crosby Steam Gage &amp; Valve Co., Boston.

**Galvanized Ware**

Keen &amp; Haggerty Mfg. Co., Baltimore.

**Galvanizing**

Blackman &amp; King, 801 Greenwich St., N. Y.

Empire Pipe Bending &amp; Supply Co., Brooklyn, N. Y.

**Galvanizing Process**

U. S. Electro Galvanizing Co., 348 Broadway, N. Y.

**Garden Rakes**

Jenkins Iron &amp; Tool Co., Howard, Pa.

**Garden Tools**

Withington &amp; Cooley Mfg. Co., Jackson.

**Gas Compositometer**

Uehling, Steinbart &amp; Co., Ltd., Carlstadt, N. J.

**Gas Compressors**

Norwalk Iron Works Co., So. Norwalk.

**Gas Furnaces**

Am. Gas Furnace Co., 23 John St., N. Y.

Chicago Flexible Shaft Co., Chicago, Ill.

**Gaskets**

Canfield, H. O., Bridgeport, Conn.

**Gaskets, Iron**

Smith &amp; Son Mfg. Co., Jersey City, N. J.

**Gas Producers**

Duff Patents Co., Allegheny, Pa.

Smythe, S. R. Co., Inc., Pittsburgh, Pa.

Swindell, W. B. &amp; Bro., Pittsburgh, Pa.

**Gauges, Rolling Mill**

Haines Gauge Co., Philadelphia, Pa.

**Gears**

Boston Gear Works, Boston, Mass.

Gleason Tool Co., Rochester, N. Y.

Morse, Williams &amp; Co., Phila., Pa.

Nuttall, R. D. Co., Pittsburgh, Pa.

Poole, Robt. Son &amp; Co., Baltimore, Md.

**Gears, Rawhide**

Horsburgh &amp; Scott, Cleveland, Ohio.

**Gear Cutters**

Becker Brainard Milling Machine Co., Hyde Park, Mass.

Gould &amp; Eberhard, Newark, N. J.

Whitton, D. E. Mch. Co., New London.

**Generators, Electric**

Westinghouse Elec. &amp; Mfg. Co., Pittsburgh, Pa.

**Gimlets**

No. ton Mfg. Co., Chester, Conn.

**Glass Cutters**

Barrett, W. L., Bristol, Conn.

Bultman, F. H. & Co., Cleveland, O.  
Monce, S. G., Unionville, Conn.  
Smith & Hemenway Co., 296 Broadway, N. Y.**Glass Cutting Boards**

Lufkin Rule Co., Saginaw, Mich.

**Glue**

Baeder, Adamson &amp; Co., Phila., Pa.

**Golf Goods**

Bridgeport Gun Implement Co., 312 Broadway, N. Y.

**Grates, Rocking**

Sennett, Geo. B. Co., Youngstown, O.

**Grease, Axle**

Snow Flake Axle Grease Co., Boston.

**Grinding and Polishing Mch's.**American Emery Wheel Works, Providence, R. I.  
Barnes, W. F. & John Co., Rockford, Ill.

Besly, Chas. H. &amp; Co., Chica, O., Ill.

Brown &amp; Sharpe Mfg. Co., Providence.

Cincinnati Milling Mach. Co., Cincinnati, O.

Diamond Mach. Co., Providence, R. I.

Landis Tool Co., Waynesboro, Pa.

Northampton Emery Wheel Co., Leeds, Mass.

Norton Emery Wheel Co., Worcester, Mass.

Safety Emery Wheel Co., Springfield, O.

Springfield Mfg. Co., Bridgeport, Conn.

Tanner Co., Stroudsburg, Pa.

Universal Mach. Co., Providence, R. I.

Wilmart &amp; Morman, Grand Rapids,

**Grindstones**

Cleveland Stone Co., Cleveland, O.

**Grubbing Machine**

New Century Mfg. Co., 43 E. 8th St., N. Y.

**Guns**

Harrington &amp; Richardson Arms Co., Worcester, Mass.

Marlin Fire Arms Co., New Haven, Ct.

Remington Arms Co., 313 Broadway, New York.

Narangasset Mch. Co., Providence, R. I.

**Hack Saws**

Dissler, H. &amp; Sons, Inc., Phila., Pa.

Goodell-Pratt Co., Greenfield, Mass.

Springfield Machine Screw Co., Springfield, Mass.

Starrett, L. S. Co., Athol, Mass.

**Hack Saw Machines**

Millers Falls Co., 28 Warren St., N. Y.

**Hammer Mold**

Field, C. H., Providence, R. I.

**Hammers**

Heller Bros. Co., Newark, N. J.

Logan &amp; Strobridge Iron Co., New Brighton, Pa.

Hammers, Pneumatic

Chicago Pneumatic Tool Co., Chicago.

**Hammocks**

Palmer, I. E., Middletown, Conn.

Bicknell Hdw. Co., Janesville, Wis.

**Hand Screws**

Bliss, R. Mfg. Co., Pawtucket, R. I.

**Handle Machinery**

Defiance Machine Works, Defiance, O.

**Hangers, Barn Door**

Coleman Hardware Co., Chicago, Ill.

**Hangers, Door**

Chicago Spring Butt Co., Chicago, Ill.

Coburn Trolley Track Mfg. Co., Holyoke, Mass.

Cronk Hanger Co., Elmira, N. Y.

Lane Bros., Poughkeepsie, N. Y.

Lawrence Bros., Sterling, Ill.

Louden Machinery Co., Fairfield, Iowa.

McCabe Hanger Mfg. Co., 533-543 W. 22d Street, N. Y.

McKinney Mfg. Co., Allegheny, Pa.

Ney Mfg. Co., Canton, Ohio.

Stowell Mfg. &amp; Foundry Co., So. Milwaukee, Wis.

Wilcox Mfg. Co., Aurora, Ill.

**Hangers, Shafting**

Ball Bearing Co., Boston, Mass.

Dodge Mfg. Co., Mishawaka, Ind.

Lodge &amp; Shipley Mch. Tool Co., Cin-

cinnati, O.

McAfee, J. 14 Dey St., N. Y.

New Haven Mfg. Co., New Haven, Ct.

Pond Machine Tool Co., Lainfield, Ill.

Potter &amp; Johnson Co., Pawtucket, R. I.

Pratt &amp; Whitney Co., Hartford, Conn.

Prentiss Bros., Worcester, Mass.

Schumacher &amp; Boye, Cincinnati, O.

Seneca Falls Mfg. Co., Seneca Falls, N. Y.

Young, W. C. Mfg. Co., Worcester, Mass.

**Hardware Manufacturers**

Arcade Mfg. Co., Freeport, Ill.

Central Hardware Co., Phila., Pa.

Coleman Hardware Co., Chicago, Ill.

Logan &amp; Strobridge Iron Co., New Brighton, Pa.

Millers Falls Co., 28 Warren St., N. Y.

Ney Mfg. Co., Canton, Ohio.

Nicol &amp; Co., Chicago, Ill.

Parker, Chas., Co., Meriden, Conn.

Peek, Stow &amp; Wilcox Co., 27 Murray St., N. Y.

Stanley Works, New Britain, Conn.

Union Mfg. Co., 103 Chambers St., N. Y.

Van Wagoner &amp; Williams Hdw. Co., Cleveland, O.

Wrightsville Hdw. Co., Wrightsville, Pa.

**Hardware Mfrs.' Agents**

Graham, John H. &amp; Co., 113 Chambers St., N. Y.

Wiebusch &amp; Hilger, Ltd., 9-15 Murray St., N. Y.

**Hardware Shelving**

Warren, J. D. Mfg. Co., Chicago, Ill.

**Hardware Specialties**

Acme Shear Co., Bridgeport, Conn.

Berger Bros. Co., Philadelphia, Pa.

Enterprise Mfg. Co., Of., Phila., Pa.

Graham, John H. &amp; Co., 113 Chambers St., N. Y.

Hartford Steam Boiler Inspection and Insurance Co., Hartford, Conn.

**Iron and Steel, Swedish**

Harvey, Arthur C. Co., Boston, Mass.

Lilienberg, N., 120 Broadway, N. Y.

Milne, A. &amp; Co., 1 Broadway, N. Y.

Potts, Horace T. &amp; Co., Phila., Pa.

**Iron Commission Brokers**

Cahen &amp; Co., Phila., Pa.

Cotton, Barclay W. &amp; Co., Phila., Pa.

Cox, Justice, Jr. &amp; Co., Ltd., Phila., Pa.

**Ice Cream Freezers**

North Bros. Mfg. Co., Philadelphia, Pa.

White Mountain Freezer Co., Nashua, N. H.

**Ice Making Machinery**

Watson, R. D. &amp; Co., Phila., Pa.

**Ice Picks**

Eric Specialty Co., Erie, Pa.

**Ice Shredders**

Enterprise Mfg. Co., Philadelphia, Pa.

Eric Specialty Co., Erie, Pa.

**Ice Tools**

Gerlach, Peter &amp; Co., Cleveland, O.

Williams, A. C., Ravenna, O.

Wood, Wm. T. &amp; Co., Arlington, Mass.

**Injectors**

Jenkins Bros., New York.

Watson, N. A., Erie, Pa.

**Insurance, Boiler**

Hartford Steam Boiler Inspection and Insurance Co., Hartford, Conn.

**Iron and Steel, Swedish**

Harvey, Arthur C. Co., Boston, Mass.

Lilienberg, N., 120 Broadway, N. Y.

Milne, A. &amp; Co., 1 Broadway, N. Y.

Potts, Horace T. &amp; Co., Phila., Pa.

**Iron Commission Brokers**

Cahen &amp; Co., Phila., Pa.

Cotton, Barclay W. &amp; Co., Phila., Pa.

Cox, Justice, Jr. &amp; Co., Ltd., Phila., Pa.

**Iron and Steel, Swedish**

Harvey, Arthur C. Co., Boston, Mass.

Lilienberg, N., 120 Broadway, N. Y.

Milne, A. &amp; Co., 1 Broadway, N. Y.

Potts, Horace T. &amp; Co., Phila., Pa.

**Iron Commission Brokers**

Cahen &amp; Co., Phila., Pa.

Cotton, Barclay W. &amp; Co., Phila., Pa.

Cox, Justice, Jr. &amp; Co., Ltd., Phila., Pa.

**Iron and Steel, Swedish**

Harvey, Arthur C. Co., Boston, Mass.

Lilienberg, N., 120 Broadway, N. Y.

Milne, A. &amp; Co., 1 Broadway, N. Y.

Potts, Horace T. &amp; Co., Phila., Pa.

**Iron and Steel, Swedish**

Harvey, Arthur C. Co., Boston, Mass.

**Lockers**  
Narragansett Mch. Co., Providence, R. I.  
**Locks and Knobs**  
Central Hardware Co., Phila., Pa.  
Reading Hdw. Co., Reading, Pa.  
U. S. Steel Lock Co., Clinton, Iowa.  
**Locomotives.**  
Everson, B. M., Pittsburgh, Pa.  
**Loring Tools**  
Gericke, Peter & Co., Cleveland, Ohio.  
**Lubricants**  
Dixon, Jos., Crucible Co., Jersey City  
Snow Flake Axe Grease Co., Boston.  
**Lumbering Tools**  
Morley Bros., Saginaw, Mich.

**Machinery**  
Acme Machinery Co., Cleveland, Ohio.  
Aetleek Geo. E., 19 Liberty St., N. Y.  
Ajax Mfg. Co., Cleveland, Ohio.  
American Tool Wks. Co., Cincinnati, O.  
Baird, U. Machinery Co., Pittsburgh, Pa.  
Barnes, W. F. & John Co., Rockford, Ill.  
Bausch Mch. Tool Co., Springfield, Mass.  
Becker-Brainard Milling Mach. Co.,  
Hyde Park, Mass.  
Bliss, E. W. Co., Brooklyn, N. Y.  
Bowler, Geo. H., Cleveland, O.  
Briggs, Marvin, 12 Broadway, N. Y.  
Brown & Sharpe Mfg. Co., Providence.  
Bullard Mch. Tool Co., Bridgeport, Ct.  
Carlin Machinery & Supply Co., Alle-  
gheny, Pa.  
Carlin's Sons Thos., Allegheny, Pa.  
Cincinnati Milling Mach. Co., Cincinnati, O.  
Cincinnati Planer Co., Cincinnati, Ohio.  
Cornell, J. B. & J. M., 26th St. and 11th  
Ave., New York City.  
Davis, W. P. Machine Co., Rochester,  
N. Y.  
Dawson, A. L. & Co., Chicago, Ill.  
Detrick & Harvey Mch. Co., Baltimore,  
Md.  
Diamond Drill & Mch. Co., Birdsboro,  
Pa.  
Dean, J. B. & Co., Chicago, Ill.  
Draper Mach. Tool Co., Worcester, Mass.  
Du Bois Iron Works, Du Bois, Pa.  
Farrel F'dry & Mch. Co., Ansonia, Conn.  
Ferracutte Mch. Co., Bridgeton, N. J.  
Fish, H. C. Machine Works, Worcester,  
Mass.  
Garvin Machine Co., Spring and Varick  
Sts., N. Y.  
General Supply Co., 40 John St., N. Y.  
Geometric Drill Co., Westville, Conn.  
Gray, Robt. J., 52-54 E. 13th St., N. Y.  
Hannan & Finton, Springfield, Mass.  
Harris Mch. Co., Minneapolis, Minn.  
Hendey Machine Co., Torrington, Conn.  
Hill, Henry F., Boston, Mass.  
Hill, Clark & Co., Boston, Mass.  
Johnson, Israel H., Jr., & Co., Phila.  
Johnson, Wm. C. & Sons Mch. Co., St.  
Louis, Mo.  
Kaiser, A. V. & Co., Phila., Pa.  
Keay & Lear Mch. Co., Coshocton, O.  
Lodge & Shiplev Mch. Tool Co., Cincinnati, O.  
Lund, S. T., Boston, Mass.  
McCabe, J. J., 14 Dec Street, N. Y.  
McDowell & Co., Pittsburgh, Pa.  
McDowell Stocker & Co., Chicago.  
Manning, Maxwell & Moore, 85-89 Lib-  
erty St., N. Y.  
Manville, E. J. Mach. Co., Waterbury, Ct.  
Marshall & Huschart Mch. Co., Chi-  
cago, Ill.  
Mossberg, Frank Co., Attleboro, Mass.  
National Machine-y Co., Tiffin, Ohio.  
New Doty Mfg. Co., Janesville, Wis.  
New Haven Mfg. Co., New Haven, Conn.  
New York Machinery Depot, 178 Broad-  
way, New York.  
Niles Tool Works Co., 128 Liberty  
St., N. Y.  
Niles, H. M. Mch. Co., Bridgeport, Ct.  
Paradox Machinery Co., Chicago, Ill.  
Pennsylvania Machinery Co., Phila., Pa.  
Phila. Machine Tool Co., Phila., Pa.  
Pittsburgh Mfg. Co., Pittsburgh, Pa.  
Pond Machine Tool Co., Plainfield, N. J.  
Poole, Robt. & Son Co., Baltimore, Md.  
Potter & Johnston Co., Pawtucket, R. I.  
Poulterer & Co., Phila., Pa.  
Pratt & Whitney Co., Hartford, Conn.  
Frentice Bros., Worcester, Mass.  
Prantiss Tool & Supply Co., 115 Liberty  
St., N. Y.  
Raiford & Williams, Chicago, Ill.  
Reade, Wm. A. & Co., Cleveland, O.  
Seyffert's Sons, L. F., Philadelphia, Pa.  
Siquerry Tool Co., Hartford, Conn.  
Thomas & Lowe Machinery Co., Prov-  
idence, R. I.  
Toomey, Frank, Philadelphia, Pa.  
Waterbury Farrel Foundry & Mch. Co.,  
Waterbury, Conn.  
Wetherill, Robert & Co., Chester, Pa.  
Windor Machine Co., Windsor, Vt.  
Wormer, C. C., Wm. C. & Sons, Detroit, Mich.  
York, S. M. Co., Cleveland, O.

**Machinery, Wood Working**  
Defiance Machine Wks., Defiance, O.  
Fay, J. A. & Egan Co., Cincinnati, O.  
**Machinery Springs**  
Scott, Chas. Spring Co., Phila., Pa.  
**Machinery Builders**  
Chapman, J. B. & Co., Springfield, Mass.  
U. S. Projectile Co., Brooklyn, N. Y.  
**Machine Knives**  
Loyd, John Co., 558-562 Water St., N. Y.  
**Machine Screws—See Screws, Ma-  
chine**  
**Machine Screw Work**  
Spencer Automatic Mch. Screw Co.,  
Hartford, Conn.  
**Machine Tools—See Machinery**  
**Machine Work**  
N. R. H. Co., Pittsburgh, Pa.  
**Machinist's Wrenches**  
Billings & Spencer Co., Hartford Conn.  
**Machinist's Scales**  
Starrett, L. S. Co., Athol, Mass.  
**Machinist's Tools and Supplies**  
Billings & Spencer Co., Hartford, Conn.  
General Supply Co., 40 John St., N. Y.  
Keystone Mfg. Co., Buffalo, N. Y.  
King, J. M. & Co., Waterford, N. Y.  
**Magnetic Separators**  
Cresson, Geo. V. Co., Phila., Pa.  
**Manganese Bronze**  
Hungerford, U. T. Brass & Copper Co.,  
121 Worth St., N. Y.  
**Manufacturing Properties**  
Hillman, J. H. & Co., Pittsburgh, Pa.  
**Manufacturing Sites**  
Chicago, Milwaukee & St. Paul R. R.,  
Chicago, Ill.  
Southern Railway Co., Washington,  
D. C.

**Measuring Machines**  
Rogers, Jno. M. Bos., Gauge & Drill  
Wks., Gloucester City, N. J.  
**Meat Choppers**  
Brown, J. H., 160 Duane St., N. Y.  
Enterprise Mfg. Co. of Pa., Phila., Pa.  
Peck, Stow & Wilcox Co., 27 Murray St.,  
New York.  
Streeter, F. & Co., Rochester, N. Y.  
Woodruff, O. D., Potistown, Pa.  
**Metal Brokers**  
American Metal Co., 52 Broadway, N. Y.  
**Metals**  
Hendricks Bros., 49 Cliff St., N. Y.  
Belfeller, Theo. & Co., Buffalo, N. Y.  
Hungerford, U. T. Brass & Copper Co.,  
121 Worth St., N. Y.  
Rutter, A. T., 256 Broadway, N. Y.  
United Metals Selling Co., 11 Broadway,  
N. Y.  
**Metal Polish**  
Hoffman, Geo. W., Indianapolis, Ind.  
**Metal Spinning**  
Goodwin & Kintz Co., Winsted, Conn.  
**Milling Machines**  
Agans Co., Dubuque, Iowa.  
Becker-Brainard Milling Machine Co.,  
Hyde Park, Mass.  
Brown & Sharpe Mfg. Co., Providence.  
Carter & Hakes Mch. Co., Winsted, Ct.  
Cincinnati Milling Mach. Co., Cincinnati, O.  
Fox Machine Co., Grand Rapids, Mich.  
Garvin Machine Co., Spring and Varick  
Sts., N. Y.  
Niles Tool Works Co., 136-138 Liberty  
St., N. Y.  
Shuster, F. B. Co., New Haven, Conn.  
Thurston Mfg. Co., Providence, R. I.  
**Mincing Knives**  
Bishop, Geo. H. & Co., Cincinnati, O.  
Palmer Hdw. Mfg. Co., Troy, N. Y.  
**Mining Machinery**  
Allis, E. P. Co., Milwaukee, Wis.  
Rand Drill Co., 100 Broadway, N. Y.  
**Mining Screens**  
Harrington & King Perforating Co.,  
Chicago, Ill.  
Howard & Morse, 45 Fulton St., N. Y.  
Michigan Wire Cloth Co., Detroit, Mich.  
**Miter Boxes**  
Thomson Bros. & Co., Lowell, Mass.  
**Molding Machines**  
Adams Co., Dubuque, Iowa.  
Maywood Fdry. & Mch. Co., Chicago.  
**Motor Fans**  
Hungerford, U. T. Brass & Copper Co.,  
121 Worth St., N. Y.  
**Motors, Air**  
Stow Flexible Shaft Co., Phila., Pa.  
**Motors, Electric**  
Eddy Electric Mfg. Co., Windsor, Conn.  
General Electric Co., Schenectady, N. Y.  
Sturtevant, B. F. Co., Boston, Mass.  
Westinghouse Elec. & Mfg. Co., Pitts-  
burgh, Pa.  
**Motors, Air**  
Stow Flexible Shaft Co., Phila., Pa.  
**Motors, Electric**  
Eddy Electric Mfg. Co., Windsor, Conn.  
General Electric Co., Schenectady, N. Y.  
Sturtevant, B. F. Co., Boston, Mass.  
Westinghouse Elec. & Mfg. Co., Pitts-  
burgh, Pa.  
**Nail Clippers**  
Cook, H. C. Co., Ansonia, Conn.  
**Nail Machinery**  
Crescent Mfg. Co., Belleville, Ill.  
Pittsburgh Mfg. Co., Pittsburgh, Pa.  
**Nail Pullers**  
Bridgeport Mfg. Co., Bridgeport, Conn.  
Hagen & Reid, Troy, N. Y.  
Scranton & Co., The New Haven, Conn.  
Snow L. T., New Haven, Conn.  
**Name Plates, Machinery**  
Livermore, Homer F., Boston, Mass.  
Murdock Parlor Grade Co., Boston, Mass.  
**Natural Gas Pumps**  
Norwalk Iron Wks. Co., So. Norwalk, Ct.  
**Nickel Platers' Supplies**  
Hanson & Van Winkle Co., Newark, N. J.  
**Nickeloid**  
American Nickeloid Co., Peru, Ill.  
**Norway Shapes**  
Rowland, William & Harvey, Frank-  
ford, Philadelphia.  
**Nuts—See Bolts**  
**Nuts, Self-Locking**  
National Elastic Nut Co., Milwaukee,  
Wis.  
**Nut Machines**  
Dunham Nut Co., Unionville, Conn.  
**Oil Burners**  
Burns H. dro-Carbon Burner Co., Fort  
Plain, N. Y.  
**Oil Burning Appliances**  
Rockwell Engineering Co., 26 Cortlandt  
St., N. Y.  
**Oil Extractor**  
Reed & Curtis Mch. Screw Co., Worcester,  
Mass.  
**Oil Heaters—See Oil Stoves.**  
**Oil Stones**  
Pike Mfg. Co., Pike Station, N. H.  
**Oil Stoves—(See Stoves Oil, Vapor and  
Gasoline)**  
**Oilers**  
Gem Mfg. Co., Pittsburgh, Pa.  
Hamer & Co., Bradford, Conn.  
Stoutenburg Mfg. Co., Keighsburg, Ill.  
Wilson & Hobbs Mfg. Co., Bridgeport,  
Conn.  
**Oilless Bearings**  
North American Metalline Co., Long  
Island City, N. Y.  
**Ore Breakers**  
Aultman Co., Canton, O.  
Cresson, Geo. V. Co., Phila., Pa.  
**Ores**  
Blair, Reed F. Co., Pittsburgh, Pa.  
Samuel, Frank, Philadelphia, Pa.  
Wister, Francis, Philadelphia, Pa.  
**Ox Shoes**  
Scranton Forging Co., Scranton, Pa.  
Woodruff, Walter W. & Sons, Mt. Carmel, Conn.  
**Packing**  
Boston Belting Co., Boston, Mass.  
Morrison, Robert, St. Louis, Mo.  
Peerless Rubber Mfg. Co., 16 Warren  
Street, N. Y.  
**Packing, Iron**  
Smooth on Mfg. Co., Jersey City, N. J.  
**Padlocks**  
Graham, John H. & Co., 113 Chambers  
Street, New York.  
**Paints**  
Dixon, Jos., Crucible Co., Jersey City.

**Pants Stretcher**  
Covert Mfg. Co., West Troy, N. Y.  
**Patent Solicitors**  
Goepel & Barger, 230 Broadway,  
N. Y.  
Hamlin, Geo. R., Washington, D. C.  
Howson & Howson, Philadelphia and  
Washington, D. C.  
Stocking, E. B., Washington, D. C.  
**Patterns**  
Norwalk Pattern & Mfg. Co., So. Nor-  
walk, Conn.  
Mt. Vernon Pattern & Model Works,  
Mt. Vernon, O.  
**Perforated Metal**  
Clinton Wire Cloth Co., Clinton, Mass.  
Harrington & King Perforating Co., Chi-  
cago, Ill.  
Hungerford, U. T. Brass & Copper Co.,  
121 Worth St., N. Y.  
**Phosphor Bronze**  
Hungerford, U. T. Brass & Copper Co.,  
121 Worth St., N. Y.  
Phosphor Bronze Smelting Co., Limited,  
Philadelphia.  
**Phosphor Tin**  
Crescent Phosphorized Metal Co., Phila-  
delphia, Pa.  
Hark & Naumann, 518 Pearl St., N. Y.  
Syracuse Smelting Wks., Syracuse, N. Y.  
**Picture Wire**  
Ossowan Mills Co., Norwich, Conn.  
**Pig Casting Machines**  
Heyl & Patterson, Pittsburgh, Pa.  
**Pig Iron**  
Alabama Consolidated Coal & Iron Co.,  
Birmingham, Ala.  
Ashland Steel Co., Ashland, Ky.  
Baird, C. R. & Co., Phila., Pa.  
Cherry Valley Iron Co., Pittsburgh, Pa.  
Dimmick, J. K. & Co., Phila., Pa.  
Hickman, Williams & Co., Chicago, Ill.  
Houston, C. B. & Co., Philadelphia, Pa.  
Nicol, B. & Co., 39-46 Wall St., N. Y.  
Samuel, Frank, Philadelphia, Pa.  
Sloss-Sheffield Steel & Iron Co., Bir-  
mingham, A. A.  
Snyder, W. P. & Co., Pittsburgh, Pa.  
Superior Charcoal Iron Co., Grand Rap-  
ids, Mich.  
Tennessee Coal, Iron & R. R. Co., Bir-  
mingham, Ala.  
Virginia Iron, Coal and Coke Co., Bris-  
tol, Va.—Tenn.  
**Pig Iron Analysis**  
Church, S. R., San Francisco, Cal.  
**Pig Iron Storage**  
Am. Pig Iron Storage Warrant Co., 4  
Wall St., N. Y.  
**Pig Lead**  
Perma. Smelting Co., Pittsburgh, Pa.  
**Pile Drivers**  
Vulcan Iron Works, Chicago, Ill.  
**Pipe, Bent**  
National Pipe Bending Co., New Haven,  
Conn.  
National Tube Co., Pittsburgh, Pa.  
Whitlock Coil Pipe Co., Hartford, Ct.  
**Pipe Coupling**  
Williams, J. H. & Co., Brooklyn, N. Y.  
**Pipe Cutting and Threading Ma-  
chines**  
Armstrong Mfg. Co., Bridgeport, Conn.  
Bignal & Keele Mfg. Co., Edwards-  
ville, Ill.  
Curtis & Curtis, Bridgeport, Conn.  
Jarecki Mfg. Co., Erie, Pa.  
Merrill Mfg. Co., Toledo, O.  
Saunders' Sons, D., Yonkers, N. Y.  
**Pipe Grips**  
Prentiss Vise Co., 44 Barclay, N. Y.  
**Pipes, Fittings, &c.**  
Jarecki Mfg. Co., Erie, Pa.  
McNab & Harlin Mfg. Co., N. Y.  
**Pipe, Riveted Steel**  
Pollock, W. B. Co., Youngstown, O.  
Scaife, Wm. B. & Sons, Pittsburgh.  
**Pipe, Water and Gas**  
Millar, C. & Son Co., Utica, N. Y.  
National Tube Co., Pittsburgh, Pa.  
Red Jacket Mfg. Co., Davenport, Iowa.  
U. S. Cast Iron Pipe & Foundry Co.,  
Phila., Pa.  
Warren City Boiler Works, Warren, O.  
Wood, R. D. & Co., Philadelphia, Pa.  
**Pistol Hoods, Tobin Bronze**  
Ansonia Brass & Copper Co., 99 John  
St., N. Y.  
**Planes**  
Stanley Rule & Level Co., N. Y.  
**Planers**  
Amer. Tool Works Co., Cincinnati, O.  
Baird, U. Machinery Co., Pittsburgh, Pa.  
Cincinnati Planer Co., Cincinnati, O.  
Derrick & Harvey Mch. Co., Baltimore,  
Md.  
Fond Machine Tool Co., Plainfield, N. J.  
Whitecomb Mfg. Co., Worcester, Mass.  
Wilson, W. A., Rochester, N. Y.  
**Plated Ware**  
International Silver Co., Meriden, Ct.  
**Plates, Iron and Steel**  
Jones & Laughlin, Ltd., Pittsburgh, Pa.  
Lukens Iron & Steel Co., Coatesville, Pa.  
Singer, Nimick & Co., Pittsburgh,  
Pa.  
Wood, Alan Co., Philadelphia.  
**Plates Iron Work**  
Scaife, Wm. B. & Sons, Pittsburgh.  
**Pliers**  
Bridgeport Mfg. Co., Bridgeport, Conn.  
Cronk Hanger Co., Elmira, N. Y.  
Utica Drop Forge & Tool Co., Utica,  
N. Y.  
**Pneumatic Tools**  
Chicago Pneumatic Tool Co., Chicago,  
Phila. Pneumatic Tool Co., Phila., Pa.  
**Pocket Knives**  
Cattaraugus Cutlery Co., Little Valley,  
N. Y.  
**Polishing Wheels**  
Divine Bros. Co., Utica, N. Y.  
**Portable Track**  
Atlas Bolt & Screw Co., Cleveland, O.  
**Poultry Fencing**  
DeKalb Fence Co., DeKalb, Ill.  
**Poultry Nettings**  
Gilbert & Beaneat Mfg. Co., 42 Cliff St.,  
N. Y.  
N. Y. Wire Cloth Co., Trenton, N. J.  
Tyler, W. S. Co., Cleveland, O.  
Wright & Colton Wire Cloth Co., Wor-  
cester, Mass.  
**Power Hack Saws**  
Hoefle, Mfg. Co., Freeport, Ill.  
**Power Hammers**  
Beadry & Co., Boston, Mass.  
Bradley Co., Syracuse, N. Y.  
Dienelt & Eisenhardt, Philadelphia.  
Dupont Mfg. Co., St. Johnsbury, Vt.  
Kiddier, R. E., Worcester, Mass.  
Miner & Peck Mfg. Co., New Haven, Ct.  
Scranton & Co., The New Haven, Conn.  
**Power Transmitting Mach'y**  
Cresson, Geo. V. Co., Phila., Pa.  
Dodge Mfg. Co., Mishawaka, Ind.  
Norwalk Iron Wks. Co., So. Norwalk, Ct.  
**Pressed Metal Work**  
Avery Stamping Co., Cleveland, Ohio.  
**Presses, Power**  
Adriance Mach. Works, Brooklyn, N. Y.  
Bliss, E. W. Co., Brooklyn, N. Y.  
Cross & Spehr Mch. Co., Waterbury, Ct.  
Ferracutte Mach. Co., Bridgeton, N. J.  
Hibbard, W. H., Brooklyn, N. Y.  
Hilles & Jones Co., Wilmington, Del.  
Keagy & Lear Mch. Co., Co. Schuyler, O.  
Lefler, Chas. & Co., Brooklyn, N. Y.  
Manville, E. J. Mch. Co., Waterbury, Ct.  
Mossberg & Granville Mfg. Co., Prov-  
idence, R. I.  
National Machine & Tool Wks., Buffalo.  
Pawlak Machine Co., Boston, Mass.  
Phila. Machine Tool Co., Phila., Pa.  
Rudolph & Krummel, Chicago, Ill.  
Shuster, F. B. Co., New Haven, Conn.  
**Projectiles**  
National Tube Co., Pittsburgh, Pa.  
**Pruning Shears**  
Cronk Hanger Co., Elmira, N. Y.  
**Pulleys**  
Amer. Pulley Co., Phila., Pa.  
Dodge Mfg. Co., Mishawaka, Ind.  
Eastern Machinery Co., New Haven, Ct.  
Evans, G. F., Boston, Mass.  
Forster Pulley Works, Rochester, N. Y.  
Hess Snyder & Co., Massillon, O.  
Jones & Laughlin, Ltd., Pittsburgh, Pa.  
Saginaw Mfg. Co., Saginaw, Mich.  
Woods, T. B. Sons, Chambersburg, Pa.  
**Pumping Machinery**  
Cook, A. D., Lawrenceburg, Ind.  
Fitter & Stowell Co., Milwaukee, Wis.  
Ingersoll-Sergeant Drill Co., 26 Cor-  
landt St., N. Y.  
Lake City Engineering Co., Erie, Pa.  
McGowan, J. H. & Co., Cincinnati, O.  
Southwick Fdry. & Mch. Co., Philadel-  
phia, Pa.  
**Pumps**  
Athol Pump Co., Athol, Mass.  
Barney Mfg. Co., Mansfield, O.  
Deming Co., Salem, O.  
Edson Mfg. Co., Boston, Mass.  
Flint & Walling Co., Kendallville, Ind.  
Hess, Snyder & Co., Massillon, O.  
Humphreys Mfg. Co., Mansfield, O.  
Myers, F. E. & Bro., Ashland, Ohio.  
Red Jacket Mfg. Co., Davenport, Ia.  
St. Joseph Pump & Mfg. Co., St. Joseph,  
Mo.  
Wilder, S. & Co., Holliston, Mass.  
**Punches, Conductors'**  
Woodman, R. Mfg. & Supply Co., Bos-  
ton, Mass.  
**Punches and Shears, Hand and  
Power**  
Bethlehem Foundry & Machine Co., So.  
Bethlehem, Pa.  
Bicknell Hdw. Co., Jas. eville, Wis.  
Bilas, E. W. Co., Brooklyn, N. Y.  
Hilles & Jones Co., Wilmington, Del.  
Mersick, C. S. & Co., New Haven, Conn.  
New Doty Mfg. Co., Janesville, Wis.  
Williams, White & Co., Moline, Ill.  
**Punching and Shearing**  
Harrington & King Perforating Co.,  
Chicago, Ill.  
**Push Carts**  
Syracuse Chilled Plow Co., Syracuse.  
**Pyrometers**  
Uehling, Steinbart & Co., Ltd., Carl-  
stadt, N. J.  
**Railways, Industrial**  
Hunt, C. W. Co., West New Brighton,  
N. Y.  
**Rat and Mouse Traps**  
Burditt & Williams, Boston, Mass.  
**Ratchet Drills**  
Keystone Mfg. Co., Buffalo, N. Y.  
**Razors**  
Buck Bros., Millbury, Mass.

**Razor Hones**  
Lake Mfg. Co., Pike Station, N. H.

**Reamers**  
Horse Twist Drill & Mch. Co., New Bedford, Mass.

**Recording Gauges**  
Pistol Co., Waterbury, Conn.

**Reeling, Steinbart & Co., Ltd.** Carlstadt, N. J.

**Reels**  
Dryz, A. B. Co., New Haven, Conn.

**Refrigerating Machinery**  
York Mfg. Co., York, Pa.

**Refrigerators**  
State Mfg. Co., Nashua, N. H.

**Registers**  
Well Mfg. & Foundry Co., So. Milwaukee, Wis.

**Relaying Rails**  
Donaldson & Newton, Phila., Pa.

**Reinforcing Iron Co., Cincinnati, O.**

**Reid & Spalding**, 32 Broadway, N. Y.

**Reed Rail Supply Co.** 100 B'way, N. Y.

**Reloading Tools**  
Bridgeport Gun Implement Co., 313-315 Broadaway, N. Y.

**Hungerford, U. T.** Brass & Copper Co., 121 Worth St., N. Y.

**Reed Mfg. Co.** New Haven, Conn.

**Reinforcing Sets, Family**  
Mitchell, W. B. Chicago, Ill.

Schrav-ers, M. Sons & Co., Chicago, Ill.

Star Steel Plate Co., Newark, N. J.

**Repair Outfits, Farmers'**  
Imperial Bl. Snap Co., Racine, Wis.

**Revolution Counters**  
Fitzkin, A. B. Machry. Co., Providence, R. I.

**Revolvers**  
Harrington & Richardson Arms Co., Worcester, Mass.

Johnson, Iver, Arms & Cycle Works, Fitchburg, Mass.

**Revolvers**  
Electric Controller & Supply Co., Cleveland, O.

**Rivets**  
Matlin Fire Arms Co., New Haven, Ct.

Remington Arms Co., 315 B'way, N. Y.

Stevens Arms & Tool Co., Chicopee Falls, Mass.

**Riveting Rollers**  
Shuster, F. B. Co., New Haven, Conn.

**Riveters**  
Phila. Pneumatic Tool Co., Phila., Pa.

**Riveters, Pneumatic**  
Chicago Pneumatic Tool Co., Chicago, Ill.

**Rivets**  
American Iron & Steel Mfg. Co., Lebanon, Pa.

American Screw Co., Providence, R. I.

Burden Iron Co., Troy, N. Y.

Cark & Cowles, Plainville, Conn.

Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

McNamee, G. E. & Co., Phila., Pa.

Plymouth Mill, Plymouth, Mass.

Rockford Bolt Works, Rockford, Ill.

Wenzend C. C. & E. P., New Brighton, Pa.

**Riveting Machines**  
Bethlehem Foundry & Mch. Co., So. Bethlehem, Pa.

Shuster, F. B. Co., New Haven, Conn.

**Rod Mill Machinery**  
Bradcock Machine & Mfg. Co., Bradcock, Pa.

Morgan Construction Co., Worcester, Mass.

**Roll Turning Tools**  
Bethlehem Foundry & Mch. Co., So. Bethlehem, Pa.

Ball Bearing Co., Boston, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

**Rolling Mill Machinery**  
Booth, The Loyd Co., Youngstown, O.

Everson, B. M. Pittsburgh, Pa.

Franklin-Kneeland Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach. Co., Ansonia, Ct.

Franklin-Kneeland Mach. Co., Pittsburgh.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Lorain Foundry Co., Lorain, Ohio.

Mesta Machine Co., Pittsburgh, Pa.

Morgan Construction Co., Worcester, Mass.

Mossberg & Granville Mfg. Co., Providence, R. I.

Penna. Engineering Wks., New Castle, Penna.

Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

**Hollow, Chilled, Sand and Steel**  
Booth, The Lloyd Co., Youngstown, O.

Farrel F'dry & Mach.

**Frankford Steel Co., Philadelphia.** Hobson, Houghton & Co., 99 John St., N. Y.

**Jesson, Wm. & Sons, Sheffield, England.** J. & J. John St., New York.

**Jones & Laughlin, Ltd., Pittsburgh, Pa.** Kidd Bros., Burgher Steel Wire Co., McKee's Rocks, Pa.

**La Belle Steel Co., Pittsburgh, Pa.** Lorain Steel Co., Lorain, Ohio.

**Lukens Iron & Steel Co., Coatesville, Pa.** Nash, Geo. & Co., Chicago.

**National Steel Co., Battery Park Building, N. Y.** Newkirk, J. B. & Co., Philadelphia, Pa.

**Otis Steel Co., Ltd., Cleveland, Ohio.** Republic Iron & Steel Co., Chicago, Ill.

**Rivoli, Wm. & Harvey, Frankford, Philadelphia.** Singer, Nimick & Co., Inc., Pittsburgh.

**Wardlow, S. & C., Sheffield, England.** Wilmet & Hobbs Mfg. Co., Bridgeport.

**Manufacturers' Agents** Ogden & Wallace, 57-533 Greenwich St., New York.

**Snyder, W. P. & Co., Pittsburgh, Pa.** Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.

**Virginia Iron, Coal and Coke Co., Bristol, Va., Tenn.**

**Steel, Self Hardening** Denman & Davis, 35-37 John St., N. Y.

**Steel Rails** Lorain Steel Co., Lorain, Ohio.

**Steel Stamps and Stencil Dies** Eucker, L. A. Stamp Wks., Little Ferry, N. J.

**Ness, Geo. M., Jr., 61 Fulton St., N. Y.** Schwerdtle & Siebert, Bridgeport, Conn.

**Steel, Tool** Bruehren Steel Co., Bruehren, Pa.

**Crescent Steel Co., Pittsburgh, Pa.** Denman & Davis, 35-37 John St., N. Y.

**Frankford Steel Co., Philadelphia, Pa.** Jessop, Wm. & Sons, Sheffield, England, 91 John St., N. Y.

**Jones, B. M. & Co., Boston, Mass.** La Belle Steel Co., Pittsburgh, Pa.

**Nash, Geo. & Co., Chicago.** Singer, Nimick & Co., Pittsburgh, Pa.

**Step Ladders, Rolling** Bicycle Step Ladder Co., Chicago, Ill.

**Coburn Trolley Track Mfg. Co., Holvoe, Mass.** Millbradt, G. A. & Co., St. Louis, Mo.

**Morey Bros., Saginaw, Mich.**

**Stocks and Dies** Armstrong Mfg. Co., Bridgeport, Conn.

**Card, S. W. Mfg. Co., Mansfield, Mass.** Curtis & Curtis, Bridgeport, Conn.

**Fairbanks Co., 311 Broadway, N. Y.** Hollande Mfg. Co., Erie, Pa.

**Jones & Lamson Mch. Co., Springfield, Vt.** Jarecki Mfg. Co., Erie, Pa.

**Saunders' Sons, D. Yonkers, N. Y.** Wells Bros. & Co., Greenfield, Mass.

**Wiley & Russell Mfg. Co., Greenfield, White Bros., Wrentham, Mass.**

**Stone Cutting Machinery** Gilmore, J. Bennett Bidg., N. Y.

**Stone Working Machinery** Patch, F. R. Mfg. Co., Rutland, Vt.

**Stop Screws** Head, A. P. & Co., Chicago, Ill.

**Store Fixtures** Warren, J. M. Mfg. Co., Chicago, Ill.

**Storm Sash Hanger** Wint-r, R. G., Minneapolis, Minn.

**Storm Window Fasteners** Woodruff, W. W. & Sons, Mt. Carmel, Ct.

**Stove Linings** Ostrander Fire Brick Co., Troy, N. Y.

**Stove Pipe Thimbles** Cheney, S. & Son, Manu. N. Y.

**Stoves, Oil, Vapor and Gasoline** Schneider & Trenkamp Co., Cleveland, Ohio.

**Straitening Machines, Wire and Sheet Metal** Shuster, F. B. Co., New Haven, Conn.

**Structural Iron and Steel Work** American Bridge Co., East Berlin, Ct.

**Boston Bridge Works, Boston, Mass.** Du Bois Iron Works, Du Bois, Pa.

**E. Stern B. Ridge & Structural Co., Worcester, Mass.** Forest City Steel & Iron Co., Cleveland, Ohio.

**Illinois Steel Co., Chicago, Ill.** Moseley Iron Bridge & Roof Co., 39 Cortlandt St., N. Y.

**New England Structural Co., Boston, Mass.** Phoenix Iron Co., Philadelphia, Pa.

**Miller-Conley Mfg. Co., Pittsburgh, Pa.** Stewart Iron Works, Cincinnati, Ohio.

**West Side Foundry Co., Troy, N. Y.**

**Sulphuric Acid** Mathieson & Seeler Zinc Co., La Salle, Ill.

**Swaging Machines** Eascisor Needle Co., Torrington, Ct.

**Table Ware** International Silver Co., Meriden, Ct.

**Tacks, Brads, &c.** Diamond Tack & Nail Works, Raynham, Mass.

**Grand Crossing Tack Co., Grand Crossing, Ill.** Milwaukee Tack Co., Milwaukee, Wis.

**Plymouth Mills, Plymouth, Mass.** Kippie & Bartlett, Plymouth, Mass.

**Sherrill Co., Birmingham, Conn.**

**Tack and Nail Machinery** Kimball Bros. & Sprague, Brockton, Mass.

**Tanks, Iron and Steel** Scaife, Wm. B. & Sons, Pittsburgh.

**Tapes** Lufkin Rule Co., Saginaw, Mich.

**Tap Holder** Ideal Machine Works, Hartford, Conn.

**Tapping Machines** H. Bell, Harvey, Bridgeport, Conn.

**Taps and Dies** Bessey, C. H. & Co., Chicago, Ill.

**Butterfield & Co., Derby Line, Vt.** Card, S. W. Mfg. Co., Mansfield, Mass.

**Reece, E. F. Co., Greenfield, Mass.** Wells Bros. & Co., Greenfield, Mass.

**Wiley & Russell Mfg. Co., Greenfield, Winter Bros., Wrentham, Mass.**

**Telephones** Rawson Electric Co., Elyria, Ohio.

**Terne Plate** American Tin Plate Co., N. Y.

**Thimble Skeins** Mitchell, W. B., Chicago, Ill.

**Time Recorders** Chicago Time Register Co., Chicago, Ill.

**Nanz, C. & Co., 127 Duane St., N. Y.** Simplex Time Recorder Co., Gardner, Mass.

**Waggoner Watchman Clock Co., Grand Rapids, Mich.**

**Tin Mills** Philadelphia Roll & Mch. Co., Phila., Pa.

**Phillips, F. B. & Sons Co., Phila., Pa.**

**Tinners' Tools and Machines** Niagara Machine & Tool Works, Buffalo.

**Tin Plate** American Tin Plate Co., N. Y.

**Champion Iron & Steel Co., Muskegon Mich.**

**Merchant & Co., Inc., Philadelphia, Pa.**

**Tin Plate Machinery** Lloyd Booth Co., Youngstown, Ohio.

**Tinware** Keen & Hagerty, Baltimore, Md.

**Tiware Machinery** Shuster, F. B. Co., New Haven, Conn.

**Tobin Bronze** Asonia Brass & Copper Co., 99 John St., N. Y.

**Toe Calks, Steel** Burke, P. F., Boston, Mass.

**Tool Chests** Am. Tool Chest Co., 200 W. Houston St., New York.

**Bliss, R. Mfg. Co., Pawtucket, R. I.**

**Tool Grinders** Sellers, Wm. & Co., Inc., Phila., Pa.

**Union Mfg. Co., Buffalo, N. Y.**

**Tool Holders** Hoggon & Pettis Mfg. Co., New Haven, Conn.

**Tools** Athol Machine Co., Athol, Mass.

**Braunsdorf-Mueller Co., Elizabeth, N. J.** Brown, R. H. & Co., New Haven, Conn.

**Goodell Pratt Co., Greenfield, Mass.** Mayhew, H. H. Co., Shelburne Falls.

**Millers Falls Co., 26 Warren St., N. Y.** Springfield Machine Screw Co., Springfield, Mass.

**Stanley Rule & Level Co., 29 Chambers St., New York.** Starrett, L. S. Co., Athol, Mass.

**Stevens, J., Arms & Tool Co., Chicopee.**

**Tools, Blacksmith and Wheelwright** Champion Blower & Forge Co., Lancaster, Pa.

**Wiley & Russell Mfg. Co., Greenfield, Mass.**

**Tools, Steam and Gas Fitters'** Saunders' Sons, D. Yonkers, N. Y.

**Torches, Oil and Gasoline** Schneider & Trenkamp Co., Cleveland, O.

**Tote Boxes** Hartman Mfg. Co., 309 Broadway, N. Y.

**Tramont, H. F. & Co., Terre Haute, Ind.**

**Trolleys** Box, Alfred & Co., Philadelphia, Pa.

**Trowels** Bishop, Geo. H. & Co., Cincinnati, O.

**National Saw Co., Newark, N. J.**

**Trucks** Boston & Lockport Block Co., Lockport, Fairbanks Co., 311 Broadway, N. Y.

**Kilbourne & Jacobs Mfg. Co., Columbus, Lansing Wheelbarrow Co., Lansing, Mich.**

**Syracuse Chilled Plow Co., Syracuse, N. Y.**

**Tab Hoods** Oatman Bros., Medina, Ohio.

**Tube Expanders** Henders, C. L. Sons, Wilmington, Del.

**Tables, Seamless Drawn Copper, Brass and Bronze** Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

**Randolph-Clowes Co., Waterbury, Conn.**

**Tubing, Brass** Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

**Ivins, Ellwood, 487 Broadway, N. Y.** Phoenix Tube Co., Brooklyn, N. Y.

**Spoofford, W. S. & Son, Providence, R. I.**

**Tubing, Iron** Phoenix Tube Co., Brooklyn, N. Y.

**Tubing, Seamless** Ivins, Ellwood, 487 Broadway, N. Y.

**Tubing, Steel** Harris, Sam. & Co., Chicago, Ill.

**Heit Transmission Co., Danbury, Ct.** Ivins, Ellwood, 487 Broadway, N. Y.

**Janney, Stelmets & Co., Phila., Pa.** Leng's John S. Son & Co., 4 Fletcher St., M'Innes, C. E. & Co., Phila., Pa.

**National Tube Co., Pittsburgh, Pa.** Stewart Bros. & Co., Easton, Pa.

**Wilmet & Hobbs Mfg. Co., Bridgeport.**

**Tumbling Barrels** Henderson Bros., Waterbury, Conn.

**Northern Engineering Works, Detroit, Mich.**

**Turnbuckles** Cleveland City Forge & Iron Co., Cleveland, O.

**Merrill Bros., 465 Kent Ave., B'klyn.**

**Twist Drills** Cleve and Twist Drill Co., Cleveland.

**Morse Twist Drill & Machine Co., New Bedford, Mass.** New Process Twist Drill Co., Taunton, Mass.

**Shoemont, J. T. & Co., Providence, R. I.** Standard Tool Co., Cleveland, O.

**Twist Drill Grinders** Head, L. S. & Son, Barnstable, Mass.

**Washburn Shops of Worcester Polytechnic Inst., Worcester, Mass.** Wilmarth & Morman, Grand Rapids.

**Union Couplings** Dart, E. M. Mfg. Co., Providence, R. I.

**Upholsterers' Hardware** Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

**Valves, Gas, Water and Steam** Ashton Valve Co., Boston, Mass.

**Chapman Valve Mfg. Co., Boston.** Crosby Steam Gage & Valve Co., Boston.

**Jenkins Bros., 71 John St., N. Y.** Kennedy Valve Mfg. Co., 73 John St., N. Y.

**McNab & Harlin Mfg. Co., 56 John, N. Y.** Mason Regulator Co., Boston, Mass.

**Wood, R. D. & Co., Philadelphia, Pa.**

**Varnish** Standard Varnish Works, 29 Broadway, N. Y.

**Vegetable Slicers** Streeter, N. R. & Co., Rochester, N. Y.

**Ventilating Fans** American Blower Co., Detroit, Mich.

**Bayley, Wm. & Sons Co., Milwaukee, Wis.** Boston Blower Co., Hyde Park, Mass.

**Buffalo Forge Co., Buffalo, N. Y.** Exeter Machine Works, Boston, Mass.

**Perkins, B. F. & Son, Holyoke, Mass.**

**Ventilating System** Ormsby, C. A., Melrose, Mass.

**Ventilator Appliances** Howard & Morse, 45 Fulton St., N. Y.

**Ventilators** Drouet G. Co., Bridgeport, Conn.

**Merchant & Co., Inc., Philadelphia, Pa.** National Pancoast Ventilator Co., Phila., Pa.

**Ventilator Openers** Ormsby, E. A., Melrose, Mass.

**Vises** Athol Machine Co., Athol, Mass.

**Bignal & Keefer Mfg. Co., Edwardsville, Ill.** Hoiani's Mfg. Co., Erie, Pa.

**Howard Iron Works, Buffalo, N. Y.** Lewis Tool Co., 44 Barclay St., N. Y.

**Parker, Chas. Co., Meriden, Conn.** Prentiss Vice Co., 44 Barclay, N. Y.

**Utica Drop Forge & Tool Co., Utica, N. Y.**

**Wagon Jacks** Covert Mfg. Co., West Troy, N. Y.

**Covert's Saddlery Works, Farmer, N. Y.** Lane Bros. Co., Poughkeepsie, N. Y.

**Washers** Hal's Sam's Sons, 229 West 10th St., N. Y.

**Haskell, Wm. H. Mfg. Co., Pawtucket, R. I.** Nut & Washer Mfg. Co., Milwaukee, Wis.

**Wilson & Smith, Worcester, Mass.**

**Washers, Lead** Milton Mfg. Co., Milton, Pa.

**Washing Machines** Brammer, H. F. Mfg. Co., Davenport, Ia.

**Clark, W. J. & Co., Salem, O.** Clark, Queen & Morse, Peoria, Ill.

**Transom Openers** Ormsby, E. A., Melrose, Mass.

**Tree Guard** Hartman Mfg. Co., 309 Broadway, N. Y.

**Up-to-date Mfg. Co., Terre Haute, Ind.**

**Trolleys** Box, Alfred & Co., Philadelphia, Pa.

**Trowels** Bishop, Geo. H. & Co., Cincinnati, O.

**National Saw Co., Newark, N. J.**

**Trucks** Boston & Lockport Block Co., Lockport, Fairbanks Co., 311 Broadway, N. Y.

**Kilbourne & Jacobs Mfg. Co., Columbus, Lansing Wheelbarrow Co., Lansing, Mich.**

**Syracuse Chilled Plow Co., Syracuse, N. Y.**

**Tab Hoods** Oatman Bros., Medina, Ohio.

**Tube Expanders** Henders, C. L. Sons, Wilmington, Del.

**Tables, Seamless Drawn Copper, Brass and Bronze** Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

**Randolph-Clowes Co., Waterbury, Conn.**

**Tubing, Brass** Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

**Ivins, Ellwood, 487 Broadway, N. Y.** Phoenix Tube Co., Brooklyn, N. Y.

**Spoofford, W. S. & Son, Providence, R. I.**

**Tubing, Iron** Phoenix Tube Co., Brooklyn, N. Y.

**Tubing, Seamless** Ivins, Ellwood, 487 Broadway, N. Y.

**Tubing, Steel** Harris, Sam. & Co., Chicago, Ill.

**Heit Transmission Co., Danbury, Ct.** Ivins, Ellwood, 487 Broadway, N. Y.

**Janney, Stelmets & Co., Phila., Pa.** Leng's John S. Son & Co., 4 Fletcher St., M'Innes, C. E. & Co., Phila., Pa.

**National Tube Co., Pittsburgh, Pa.** Stewart Bros. & Co., Easton, Pa.

**Wilmet & Hobbs Mfg. Co., Bridgeport.**

**Watchman's Clocks** Nanz, C. & Co., 127 Duane St., N. Y.

**Waggoner Watchman Clock Co., Grand Rapids, Mich.**

**Water Gates** Kennedy Valve Mfg. Co., 73 John St., N. Y.

**Water Wheels** Poole, Robt. & Son Co., Baltimore, Md.

**Well Supplies** Cook, A. D., Lawrenceburg, Ind.

**Wheelbarrows** American Steel Scraper Co., Sidney, O.

**Kilbourne & Jacobs Mfg. Co., Columbus, Lansing Wheelbarrow Co., Lansing, Mich.**

**Syracuse Chilled Plow Co., Syracuse, N. Y.**

**Wind Mills** Flint & Walling Co., Kendallville, Ind.

**Window Cord** Samson Cordage Works, Boston, Mass.

**Window Fasteners** Stanley Works, New Britain, Conn.

**Window Weights** Barney & Reed Mfg. Co., Boston, Mass.

**Wire** Dillon-Griswold Wire Co., Sterling, Ill.

**Grand Crossing Tack Co., Grand Crossing, Ill.** Kidd Bros. & Burgher Steel Wire Co., McKee's Rocks, Pa.

**Miller & Van Winkle, Brooklyn, N. Y.** National Wire Co., New Haven, Ct.

**New Haven Wire Co., New Haven, N. Y.** Prentiss, Geo. W. & Co., Holyoke, Mass.

**Spencer Wire Co., Worcester, Mass.** Wolff, R. H. & Co., Ltd., 113th Street and Harlem River, N. Y.

**Wire Rope, Iron and Steel** American Steel & Wire Co., Chicago, Ill.

**Broderick & Bascom Rope Co., St. Louis.** California Wire Works, San Francisco.

**Hazard Mfg. Co., Wilkes-Barre, Pa.** A. Leschen & Sons Rope Co., St. Louis.

**Macomber & Whyte Rope Co., Chicago, Ill.** Trenton Iron Co., Trenton, N. J.

**Watertbury Rope Co., 59 south 4th, N. Y.** Williamsport Wire Co., Williamsport, Pa.

**Wire Straightening and Cutting Machinery** Shuster, F. B. Co., New Haven, Conn.

**Wire Stretchers** Arcade Mfg. Co., Freeport, Ill.

**Wood Hardware** Bliss, R. Mfg. Co., Pawtucket, R. I.

**Wood Screw Machinery** Cook, A. D. & Co., Hartford, Conn.

**Wood Trimmers** Fox Machine Co., Grand Rapids, Mich.

**Wood Working Machinery** Defiance Mch. Works, Defiance, O.

**Fay J. A. & Egan Co., Cincinnati, O.** Seneca Falls Mfg. Co., Seneca Falls, N. Y.

**Woodenware** Richmond Cedar Works, Richmond, Va.

**Wrenches** Atlas Pipe Wrench Co., 121 Liberty St., N. Y.

**Belden Machine Co., New Haven, Conn.** Bemis & Call Hdw. & Tool Co., Springfield, Mass.

**Chicago House Wrecking Co., Chicago, Ill.** Coes Wrench Co., Worcester, Mass.

**Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.** Keystone Drop Forge Co., Phila., Pa.

**Keystone Mfg. Co., Buffalo, N. Y.** Peck, Stow & Wilcox Co., 27 Murray St., N. Y.

**Star Mfg. Co., Carpentersville, Ill.** Trimont Mfg. Co., Roxbury, Mass.

**Williams, J. H. & Co., Brooklyn, N. Y.**

**Wrenches, Adjustable** Bemis & Call Hdw. & Tool Co., Springfield, Mass.

**Keystone Mfg. Co., Buffalo, N. Y.**

**Zinc Nails** Phillips, E. & Sons, So. Hanover, Mass.

**Zinc Plates** Phillips, E. & Sons So. Hanover, Mass.

Mass.  
Ind.  
on St.  
17 St.  
N. Y.  
r Co.  
s. Mo.  
Mich.  
New  
J.

Ga.

N.  
Y.  
, N.Y.

ter.  
rov.  
and

n.  
ia.  
f St.  
L. I.  
Mich.

t. Ok.  
t. Ok.  
t. Ok.  
m.

ock  
uys.

Y.

R. I.  
Fl.  
os-

O.  
ton.  
peck,

aho-

L.  
n.

tol  
n.  
ass.  
ess.

Ill.  
is.  
co.

is  
go.

Y.  
m.  
ng

7  
8  
L  
P  
h.

1  
2  
3  
4  
5  
6



# For the Game Season.

## Iver Johnson

### SHOT-GUNS and REVOLVERS.

Hardware dealers and others who sell fire-arms cannot afford to be without the *Iver Johnson* guns and revolvers. They are absolutely safe and the people know it and want them. They have been marketed for the past 30 years and are recognized everywhere as safe and reliable.

**Catalogue Free.**

**BRANCHES:**  
New York, 99 Chambers St.  
Boston, 165 Washington St.  
Worcester, 304 Main St.

**Iver Johnson's Arms & Cycle Works,**  
**FITCHBURG, MASS.**

## REPUBLIC IRON & STEEL COMPANY, STOCK EXCHANGE BUILDING, CHICAGO, ILL.

Bar Iron,	Track Fastenings,
Bar Steel,	R. R. Spikes,
Steel Plates,	Track Bolts,
Agricultural Shapes,	Carriage Bolts,
Angles, Tees, Machine Bolts	
and Channels.	G. P. Coach Screws.

## PIG IRON.

### DISTRICT SALES OFFICES:

NEW YORK,	BUFFALO,	ST. LOUIS,
CLEVELAND,	CINCINNATI,	ST. PAUL,
BIRMINGHAM,	SAN FRANCISCO,	BUTTE, MONT.

**ROBT. WETHERILL & Co.,**

**CHESTER, PA.**

**Manufacturers**

## Corliss Engines,

**BERRY SAFETY**

## BOILERS.

**CLARK & PARSONS CO.,**  
East Wilton, Maine, U. S. A.

**NEW LINE**

**Hay Corn Bread KNIVES.**

**Send for Circulars.**  
**WIEBUSCH & HILGER, Ltd., N. Y.,**  
Sole Agents for U. S. and Canada.

## CANNON FOR CAMPAIGN

**Marching Clubs.**

## Bronze Breech Loaders

**For All Saluting Purposes.**

**L. T. SNOW, Manufacturer,**  
New Haven, Conn., U. S. A.

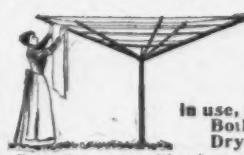
### SPECIAL ON GATE HOOKS and EYES, &c.

**Full Line Bright Wire Goods.**

**OSSAWAN MILLS CO.,**  
183 E. Broad St., Norwich, Conn.

  
**Bradley Shelf Brackets,**  
Strong, Light and All Right.  
ATLAS MFG. CO., New Haven, Ct., U.S.A.

## Hill Clothes Dryer.

  
More than  
**100,000**  
in use, pleasing everybody.  
Both yard and balcony  
Dryers.

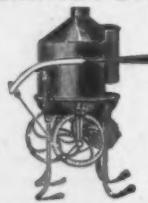
Fold them up without removing clothes-line and take indoors when not in use.  
Ask your Hardware dealer about them or send for Illustrated Catalogue giving full description and prices.  
**HILL DRYER COMPANY, Worcester, Mass.**

**FITCH SASH LOCKS**  
Send for Catalog  
  
**SATISFY**  
**BUILDERS,**  
**USERS,**  
**DEALERS.**  
MANUFACTURED BY  
**THE W. & E. T. FITCH CO., New Haven, Ct.**

Reeves  
 "Jubal" Bronze  
 Strong as Steel  
 write for prices  
 and  
 Physical Tests.  
 Paul S. Reeves & Son  
 Philadelphia, Pa. U.S.A.

## BUFFALO FORGES.

America's Best.



50 Sizes and Types.  
 Complete Blacksmith Equipment.

BUFFALO FORGE CO., - Buffalo, N. Y.

STEEL TUBES  
 (WELDLESS)  
 (COLD DRAWN)  
 (SMOOTH INSIDE AND OUT)  
 JOHN S. LENG'S SON & CO. NEW YORK.

## Diamond Tools.

The Tanite Co.,  
 Stroudsburg, Pa.

MILLER & VAN WINKLE  
 STEEL WIRE AND STEEL SPRINGS  
 TEMPERED STEEL WIRE  
 TEMPERED COMPRESSION & EXTENSION SPRINGS  
 A SPECIALTY  
 SPRINGS  
 MACHINERY  
 OFFICE & WORKS 18 to 24 BRIDGE ST. BROOKLYN N.Y.

UTICA PIPE FOUNDRY CO.

Cast Iron Pipe for Water or Gas. CHAR. MILLAR & Son Co., Utica, N. Y. Selling Agents. Also Flat-Edged Pipe, Lead Pipe and Plumbing Materials.

SPENCER AUTOMATIC MACHINE SCREW CO.

WRITE FOR DISCOUNT  
 HARTFORD, CONN.

BOMMER SPRING  
 & HINGES  
 ARE THE BEST.  
 "PRACTICALLY  
 UNBREAKABLE"  
 SAYS THE WORLD'S FAIR AWARD  
 BOMMER BROTHERS,  
 Factory, 257-271 Clason Ave.,  
 BROOKLYN, N. Y.

STANLY G. FLAGG & CO., Philadelphia, Pa.  
 Office and Wks., N.W. Cor. 19th St. & Pennsylvania Ave.  
 Manufacturers  
 of  
**STEEL CASTINGS.**  
 A Substitute for Steel and Wrought Forgings.  
 Circulars Sent on Application.

## Power Hack Saw.

## See Page 94

MILLERS FALLS CO.,  
 28 Warren St., New York.

## Springs and Axles ROLLING MILL.

F. W. Wurster & Co.,  
 375 Kent Ave., - Brooklyn, N. Y.

"LIGHTNING"  
 SCREW PLATES  
 FOR PIPE.  
 SEND FOR CATALOGUE.  
 Wiley & Russell Mfg. Co.,  
 Greenfield, Mass., U.S.A.

LIDGERWOOD  
 HOISTING ENGINES.  
 The STANDARD For QUALITY  
 and DUTY.  
 LIDGERWOOD MFG. CO., 96 Liberty St., N. Y.

ESTABLISHED  
 Spring Making, 1842. Steel Making, 1845  
 Norway Iron, 1871 (Re-Rolled).

WM. & HARVEY ROWLAND.  
 MANUFACTURERS OF  
 Springs, Steel, Re-Rolled Norway  
 Iron & Slit Norway Nail Rods.  
 Address FRANKFORD P. O., PHILADELPHIA.

GLEASON  
 TOOL CO.  
 ROCHESTER, N.Y.  
 QUIET RUNNING  
 GEARS FOR SPINNING  
 MACHINERY.

BESIDES "KENNEDY" GATES  
 WE MAKE  
 GLOBE, ANGLE  
 and RADIATOR  
 ALSO  
 SWING CHECK  
 VALVES.  
 All of a superior  
 quality.  
 THE KENNEDY VALVE MFG. CO.,  
 58 Beckman St., New York.

JOHN SOMMER'S  
 SON  
 IXL FAUCETS  
 REAMERS  
 SELECTED ROCK DRILLS  
 BORING IRON  
 LINSEED OIL  
 LUMBER  
 WOOD

## Dayton Swaging Machines

for reducing  
 and pointing  
 WIRE  
 and  
 TUBING.

Send for  
 Catalogue.



Tapering  
 and  
 Pointing  
 and all kinds  
 of  
 Reducing.  
 Also Manu-  
 facturers  
 of  
 SPOKES  
 and  
 NIPPLES.

EXCELSIOR NEEDLE CO., Torrington, Conn.



CHARLES H. BESLY CO.  
 FINE TOOLS & SUPPLIES FOR METALWORKERS  
 10 & 12 N. CANAL ST. CHICAGO, ILL. U.S.A.  
 SEND FOR THE PAGE  
 NO. CATALOGUE

LIGHT AND MEDIUM WEIGHT  
 MALLEABLE  
 IRON CASTINGS  
 TO ORDER.  
 PROMPT SERVICE, SMOOTH AND  
 WELL ANNEALED CASTINGS.  
 THE  
 CHISHOLM & MOORE MFG. CO.  
 CLEVELAND, OHIO.

Twenty Years  
 of Success!

GEM

SPRING  
 HINGES.

Write for our catalogue.

Van Wagoner & Williams  
 Hardware Co.,  
 Cleveland, O., and New York, U. S. A.